

05/26/2011

Page 1 of 2

1214806 - R8 SDMS



PacifiCorp - Third West Substation - Work Plan
King, Brian

to:

Joyce Ackerman, Craig Barnitz
05/26/2011 07:44 AM

Cc:

"Clegg, Benjamin M.", Dave Roskelley, "Christensen, Mark"

Hide Details

From: "King, Brian" <Brian.King@PacifiCorp.com>

To: Joyce Ackerman/R8/USEPA/US@EPA, Craig Bamitz <Cbarnitz@utah.gov>

Cc: "Clegg, Benjamin M." <Benjamin.Clegg@PacifiCorp.com>, Dave Roskelley
<dave@renviro.com>, "Christensen, Mark" <Mark.Christensen@PacifiCorp.com>

3 Attachments



Appendix C - SAP.pdf Appendix D - SHASP.pdf 3rd W Work Plan with Appendix A and B - 26May11.pdf

Joyce and Craig,

Please see attached, the second submittal of the Work Plan and associated documents regarding the facility upgrades at the Third West Substation property contaminated with Libby Amphibole. Attachments include:

-Work Plan with the following appendices

- Appendix A: Figures and Construction sequence
- Appendix B: Scope of Work
- Appendix C: Sampling and analysis Plan
- Appendix D: Site Health and Safety Plan

We apologize for the time that has transpired since the first submittal and lack of notice for this submittal. We look forward to your review and approval of the attached documents.

Please reply to this email indicating when we may expect this second review to be completed by you and/or your staff.

We appreciate the collaboration we have received in working with you through this effort.

Sincerely,

Brian King

T&D Environmental Services

ROCKY MOUNTAIN POWER

1407 West North Temple, NTO 120A

Salt Lake City, Utah 84116

Direct: 801-220-4831

Cell: 801-520-7854

Email: brian.king@pacificorp.com



3rd West Substation 2011 Upgrade Project Work Plan



**"3rd West Substation"
147 South 400 West
Salt Lake City, Utah**

Prepared By:

**David C. Roskelley, MSPH, CIH, CSP
R & R Environmental, Inc. (R & R)
47 West 9000 South, Suite #2
Sandy, Utah 84070
dave@rrenviro.com
Phone (801) 541-1035**



Acronyms

AHERA	Asbestos Hazard Emergency Response Act of 1986
AOC	Administrative Order on Consent
BZ	Breathing Zone
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act of 1980
CFR	Code of Federal Regulations
CRZ	Contamination Reduction Zone
EPA	U.S. Environmental Protection Agency
EL	Excursion Limit
EZ	Exclusion Zone
HEPA	High Efficiency Particulate Air
HSM	Health and Safety Manager
LA	Libby Amphibole
LOTO	Lock Out Tag Out
NCP	National Contingency Plan
NIOSH	National Institute of Occupational Safety and Health
NPE	Negative Pressure Enclosure
OSHA	Occupational Safety and Health Administration
PERCo	PacifiCorp Environmental Remediation Company
POTW	Publicly Owned Treatment Works (sanitary sewer system)
PPE	Personal Protective Equipment
QA	Quality Assurance
QA/QC	Quality Assurance/Quality Control
R&R	R&R Environmental, Inc.
SAP	Sampling and Analysis Plan
SHASP	Site Health and Safety Program
STEL	Short-Term Exposure Limit
TEM	Transmission Electron Microscopy
TWA	Time Weighted Average
UDEQ	Utah Department of Environmental Quality

Table of Contents

1.0 Introduction.....	4
1.1 Project Description	4
1.2 Document Purpose.....	5
1.3 Background.....	5
2.0 Project Team - Roles and Responsibilities	6
2.1 PacifiCorp.....	6
2.2 EPA and UDEQ.....	6
2.3 Environmental Consultant / R&R Environmental, Inc.	7
2.4 Construction Contractor(s)	7
2.5 Other Contractors	8
3.0 Management of Contaminated Materials.....	8
3.1 Pre-Construction Meeting.....	9
3.2 Site Preparation.....	9
3.2.1 Exclusion Zone Setup.....	10
3.2.2 Decontamination Setup	10
3.3 Soil Excavation.....	11
3.3.1 Contaminated Soil Removal.....	11
3.3.2 Transportation and Disposal.....	11
3.5 Air Sampling During Contaminated Soil Removal	12
3.5.1 Stationary Air Sampling.....	12
3.5.2 Personal Breathing Zone Air Sampling.....	12
3.6 Removal Area Management	12
3.6.1 Control of Surface Water	12
3.6.2 Pollution Prevention.....	13
3.6.3 Dust Control	13
3.6.4 Security	13
4.0 Progress Reporting.....	13
5.0 Schedule.....	14
Appendix A Project Elements	15
Appendix B Scope of Work	21
Appendix C Sampling and Analysis Plan	28
Appendix D Site Health and Safety Plan.....	29

1.0 Introduction

The U.S. Environmental Protection Agency (EPA), Region VIII is conducting emergency removal actions under the National Contingency Plan (NCP), utilizing CERCLA regulations, in Libby, Montana to address the risk to human health caused by exposure to Libby amphibole (LA) asbestos fibers. The LA fibers were introduced into the environment via vermiculite mining activities. LA fibers were subsequently used, spilled, and disposed of throughout the Libby area.

Much of this mined vermiculite was sent to plants throughout the United States for processing. One of these processing plants was located in Salt Lake City, Utah, at the approximate center of the block bounded by 100 and 200 South and 300 and 400 West. Concentrations of LA were found in soils and in dust in buildings within this block. EPA has conducted NCP emergency removal actions at various locations on the block.

The plot where the vermiculite processing plant once stood is now owned by PacifiCorp and is inside the fence of an electric utility substation. However, currently there is no substation electrical equipment installed within the footprint of the processing plant. The address of this PacifiCorp substation is 147 South 400 West and is known to PacifiCorp as the "3rd West Substation". It is hereinafter referred to as the PacifiCorp Property. PacifiCorp and EPA agreed, through an initial Administrative Order on Consent (AOC), that the PacifiCorp Property was to be cleaned up under the same general procedures and guidelines and in a similar manner as properties in Libby, Montana, e.g. as a NCP emergency removal action under CERCLA regulations. Remediation of the PacifiCorp Property was conducted in 2004 and 2005 as part of EPA's overall Salt Lake City NCP emergency removal action strategy, but was handled somewhat separately. Total remediation of the PacifiCorp Property was unable to be achieved by the 2004 and 2005 remedial activities due to mitigating factors such as existing energized facilities and depth of contamination; and therefore portions of the site remain contaminated with LA. PacifiCorp then entered into another AOC with the EPA and Utah Department of Environmental Quality (UDEQ) which covers these contaminated portions of the site and details additional site controls and environmental covenants. These controls and covenants pertain to ground disturbing activities and uses of the site and include the development of this Work Plan.

1.1 Project Description

PacifiCorp is converting 3rd West substation, the PacifiCorp Property, to 138kV to support load growth in downtown Salt Lake City. As part of this project, the outdated and insufficient 4kV switchgear, control building, 46kV circuit breakers (2), 46kV-12.5kV transformers (2), 12.5kV switchgear (2), and 46kV capacitor bank (1) will be removed. The foundations of these above ground structures will also be removed, the largest of which is the existing control house. New facilities to be installed consist of 138kV-12.5kV transformers (2), 12.5kV switchgear (1), control building, and 138kV ductbank and 12.5kV ductbank (trench and conduit for underground conductor to and from installed facilities). Refer to Appendix A, Project Elements, Figures A and B for an aerial photo of the existing facilities with schematic overlay of the draft general layout of planned facilities and location of new foundations to be installed. The project is anticipated to begin construction activities mid-July and last roughly 3 months in duration.

These scheduled renovations and site electrical upgrades have necessitated consultation and coordination with the EPA and the UDEQ. In accordance with the current AOC, PacifiCorp is implementing and will implement, appropriate and required measures regarding the PacifiCorp Property. PacifiCorp will utilize a number of contractors to perform various tasks during construction, including, but not limited to engineering, LA dust removal, building interior cleanup, LA contaminated soil removal, transport and disposal, air monitoring, and preparation of monitoring reports.

The construction of new facilities will require grading activities to take place and installation of new foundations. The foundations have been designed in a manner to decrease the depth of the foundations and thereby minimizing the potential for encountering LA contaminated subsurface soils. majority significant portion of the grading activities and foundation installations will take place on the eastern portion of the site where previous contaminated soils were removed and replaced with clean fill. The sequence of construction has also been developed in order to consolidate ground disturbing activities in phases rather than ongoing ground disturbance throughout the duration of the project. These design elements and construction approaches will facilitate implementation of successful LA control measures. For additional information regarding project activities and construction sequencing, refer to Appendix A.

It is not the intent of this facility upgrade project to serve in any way as continuation or follow-up remediation activities to the 2004 and 2005 activities. The intent of the activities conducted in association with this Work Plan include providing a safe working environment for construction workers, properly handling and disposing of any encountered materials containing regulated levels of LA and ensuring measures are taken to minimize risk of exposure to the public. This Work Plan outlines the approach to conducting these activities.

1.2 Document Purpose

The purpose of this Work Plan is to describe the technical requirements of the PacifiCorp 3rd West Substation 2011 Upgrade Project, define roles and responsibilities of all project resources, and to serve as a guidance document for the construction contractor and other onsite workers from which additional control measures and best management practices may be developed as needed. Appendices A – D to this Work Plan have been prepared detailing construction and associated activities, sampling and monitoring, site health and safety, and appropriate measures to be implemented.

- Appendix A Project Elements
- Appendix B Scope of Work
- Appendix C Sampling and Analysis Plan
- Appendix D Site Health and Safety Plan

This Work Plan and any applicable drawings will be reviewed and agreed upon by PacifiCorp, EPA, UDEQ, R&R Environmental, and the construction contractor(s) conducting ground disturbing activities before such activities commence.

This Work Plan is considered a living document and will be amended as necessary in coordination with the EPA and the UDEQ, in order to ensure appropriate site controls are in place throughout construction.

1.3 Background

Several reports and documents pertaining to site history and previous remediation activities have been developed for the PacifiCorp Property, which include the following:

- Site history, entitled *3rd West Substation Site History Report*, dated March 26, 2004 prepared by PacifiCorp Environmental Remediation Company (PERCo);
- Report of sampling and cleanup activities conducted entitled, *Sampling and Analysis Plan Revision 3*, dated March 2004 prepared by the U.S. Department of Transportation Volpe Center and CDM Federal Programs Corporation; and
- Final report of remediation activities to date entitled, *PacifiCorp Property Libby Amphibole Asbestos Cleanup Final Report* dated September 14, 2005, prepared by PERCo.

These reports are included in this Work Plan by reference and will be used as references as applicable.

2.0 Project Team - Roles and Responsibilities

The PacifiCorp 3rd West Substation 2011 Upgrade Project environmental team consists of PacifiCorp (site owner), EPA (Federal lead), UDEQ (State lead), R&R Environmental, Inc. (project environmental consultant), Construction Contractor (to be determined), and other contractors. The Work Plan, Appendices and other supporting documentation will be provided to the construction contractor(s) in advance of starting any ground disturbing activities. There will also be a pre-construction meeting conducted at the PacifiCorp Property to allow the contractor(s) to ask questions and fine-tune their approach to implement the Work Plan.

The EPA, UDEQ and site Health and Safety Manager (HSM) have stop work authority in the event site controls are not being followed or are deemed inadequate and results in a risk to health and safety.

The roles and responsibilities of these team members follow.

2.1 PacifiCorp

As owner of the property, PacifiCorp is responsible for coordinating the PacifiCorp 3rd West Substation 2011 Upgrade Project, which includes funding of activities associated with the removal and disposal of encountered LA containing material on the PacifiCorp Property during the course of construction. As such, PacifiCorp procures and oversees all contractors and consultants, prepares or oversees preparation of all plans and reports, and directs all work covered by this Work Plan. As needed, PacifiCorp will provide information to the public as necessary and warranted. PacifiCorp will work with the EPA, UDEQ and the construction contractor(s) to coordinate construction activities on-site, implement site controls, and any required communication efforts or strategies.

2.2 EPA and UDEQ

EPA is the lead Federal agency for implementing CERCLA Removals and providing Federal oversight of remediation actions; UDEQ is the lead State authority over the site. Associated with activities at the PacifiCorp property, the EPA and the UDEQ have established an AOC with PacifiCorp as previously referenced in Section 1.0, for ground disturbing and land use activities at the site. The EPA and the UDEQ have overall responsibility for monitoring the ground disturbing activities at the PacifiCorp Property per the AOC. The majority of regulatory oversight for this project will be performed by UDEQ. The EPA and the UDEQ responsibilities include, but are not limited to:

- Provide overall agency oversight for the potential disturbance activities.
- Maintain the AOC with PacifiCorp.
- Approve plans prepared for implementing the work.

- Coordinate with the community and local, state, and federal agencies as needed.
- Review results of any air and soil samples collected from within the project boundaries and in accordance with the sampling plan and advise accordingly.

2.3 Environmental Consultant / R&R Environmental, Inc.

R&R Environmental, Inc. (R&R) is an industrial hygiene consulting firm, with extensive experience in the health and safety aspects of asbestos work and in overseeing asbestos abatement activities. PacifiCorp has retained R&R to prepare this Work Plan and associated documents including the Sampling and Analysis Plan (SAP); refer to Appendix C and the Site Health and Safety Plan (SHASP); refer to Appendix D. R&R will also act as PacifiCorp's on-site HSM and environmental point of contact. R&R's specific duties include, but are not limited to:

- Assist PacifiCorp in planning and implementing site controls.
- Review Work Plan addenda and design documents provided by contractors and update the Work Plan as appropriate.
- Assist in pre-construction meetings.
- Track project progress.
- Monitor site security.
- Record digital photos of property before, during, and after project activities.
- Monitor the contractors to ensure compliance with approved plans, drawings, and specifications regarding site controls and environmental compliance.
- Provide technical oversight support throughout the duration of project activities.
- Provide health and safety expertise at the site.
- Inspect containments and personal decontamination stations for proper setup and operation.
- Collect confirmatory soil samples as needed.
- Procure laboratory services for analysis of removal confirmation samples and other removal-related samples (e.g., soil) as requested.
- Provide sample coordinator to generate chain-of-custody forms and coordinate analysis of samples.
- Provide copies of all paperwork, (e.g., field sample data sheets, logbooks, removal checklists, etc.) to PacifiCorp, including any revised forms.
- Maintain file folders that include sample data and copies of all applicable logbook pages, digital photographs, and EPA correspondence.
- Collect perimeter air samples throughout duration of ground disturbing activities.
- Collect personal air samples (8-hour time weighted average [TWA] and excursion limit [EL] in accordance with Occupational Safety and Health Administration [OSHA] 29 Code of Federal Regulations [CFR] 1926.1101) as required based on historical personal air sampling data.
- Record minutes of meetings.
- Prepare reports and analytical results for submittal to EPA, UDEQ and PacifiCorp.
- Work cooperatively with EPA, UDEQ and PacifiCorp to arrange appropriate personal and work-site monitoring needs.

2.4 Construction Contractor(s)

All ground disturbing activities conducted within the PacifiCorp Property will be performed in accordance with all approved plans. In summary, activities to be performed by the construction contractor(s) include:

- Adhere to and implement the Work Plan and associated documents including but not limited to exclusion zone setup and decontamination setup and maintenance.
- Implement measures identified in this plan and associated documents and provide necessary equipment and/or materials unless otherwise specifically stated.
- Attend pre-construction activity site walks upon PacifiCorp request.
- Maintain site-specific health and safety plans.
- Identify and acquire necessary permits and develop associated plans (including air quality-fugitive dust plan and water quality-storm water pollution prevention plan).
- Set up and maintain field office/staging area as needed for construction activities.
- Excavate asbestos contaminated soils to the depth and extent needed for facility installation in accordance with design documents.
- Transport excavated soils to approved offsite disposal locations.
- Conduct grading activities accordance with the grading plan or such plans to provide proper drainage.
- Conduct health and safety monitoring.
- Implement and monitor engineering controls for dust control.
- Coordinate with R&R for any required soil sampling and subsequent laboratory analyses.
- Provide competent and current HAZWOPER trained personnel to conduct the work who have been fit tested for air respirators.

The construction contractor(s) will also be required to coordinate with the site HSM and PacifiCorp to further develop the following, not limited to:

- Site decontamination process for disposal and removal of contaminated soils.
- Exclusion zone locations and zone setup (Refer to Section 3.2.1 for additional information).
- Temporary storage of contaminated material onsite, as needed.

2.5 Other Contractors

Other contractors will be procured as directed by PacifiCorp or subcontracted to the construction contractor to provide fill material, fencing, laboratory analysis, security, and other materials and services as needed. Their primary responsibility would include:

- Provide materials or services in accordance with the contract documents and as directed by PacifiCorp.

In the event qualified remediation contractors are required, such contractors will submit cost estimates, as requested by PacifiCorp, based on the Work Plan and any addenda provided. PacifiCorp, its agent R&R Environmental, or the construction contractor will manage the remediation contractor in the field. PacifiCorp and R&R will continually evaluate and oversee such contractors and make changes as necessary and feasible.

3.0 Management of Contaminated Materials

Contaminated materials may be encountered during ground disturbing activities and removal of above ground enclosed facilities such as cabinets where LA dust could accumulate. These activities will occur in a sequenced approach as presented in Appendix A, construction sequence. Construction sequencing has

been developed to limit construction duration of sub-grade work and to minimize the frequency of sub-grade construction activities and potential for encountering contaminated materials. Prior to working on or in an enclosed structure (cabinets, etc) these areas will be inspected by the HSM for any LA containing dust to assist the contractor with removal/cleaning efforts.

Soils with detectable levels of LA are considered to be contaminated and regulated through the AOC and Environmental Covenant. Releases of LA due to activities associated with this project would be considered a release of a hazardous substance and subject new restrictions and actions. All applicable and reasonable site controls are to be implemented by the construction contractor while disturbing materials contaminated with LA.

Previous excavation areas (2004 and 2005 cleanup) have been clearly delineated as shown on Figure C, Barrier Drawing, in Appendix A. This figure will be utilized to visually delineate/demarcate (based on geospatial reference point at the PacifiCorp Property) the extent of the previous excavation work (location of clean imported fill) in the field prior to ground disturbing activities. The depths of the previous excavations are also indicated in this figure. Figure B incorporates Figure C in order to identify foundation excavations that will take place wholly within the previously imported fill or remediated area. The new foundations have been designed to require shallow excavations. The maximum depth for most foundation excavations is 5 feet below ground surface. The minimum depth of clean imported fill, or the minimum depth of the previous remediation effort within the bolded dashed line shown in Figure B is 8 feet below ground surface. Therefore, soil removed from foundation excavations located within the bolded dashed line in Figure B will consist of the previously imported clean fill.

3.1 Pre-Construction Meeting

A pre-construction meeting will be held for the purpose of ensuring that all parties involved in this project understand their roles and responsibilities, as well as the roles and responsibilities of the other parties, and how they interact. All parties participating in the pre-construction meeting will explain their roles, how their responsibilities will be implemented, and any safety hazards associated with the work they will conduct. Pre-construction meeting minutes will be recorded by R&R. At a minimum, a UDEQ representative and/or the HSM will address the following topics at this meeting and continue to address these topics for the duration of the project:

- The nature of the asbestos contamination;
- Visual releases of LA during construction activities may be cause to stop work;
- Current rules and regulations related to asbestos (EPA, OSHA, AHERA, etc.) and additional information addressing management and disposal requirements associated with LA; and
- Health and safety issues regarding LA.

3.2 Site Preparation

PacifiCorp, R&R, and the construction contractor(s) will review the Work Plan and evaluate any addenda before starting ground disturbing activities. Any imminent hazards identified during the pre-construction meeting will be evaluated to determine if corrective actions are necessary. Residential traffic and pedestrian points of hazard will be identified and posted with legible traffic signs throughout the duration of the construction activities. Work area boundaries will be established, demarcated, and posted with appropriate signage or equivalent. Waste load out, suitable decontamination area, temporary soil storage areas, equipment staging areas, personnel and equipment pathways will be discussed, defined and demarcated as necessary. The construction contractor(s) will be responsible for maintaining these

boundaries throughout the duration of ground disturbing activities. Based on the excavation area, the following additional activities will be completed by the construction contractor(s).

3.2.1 Exclusion Zone Setup

Exclusion zones (EZs) will be set up inside of the designated work area to ensure the health and safety of the workers and public. EZs will be utilized and boundaries defined when ground disturbing activities take place within contaminated soils, suspected contamination is present, or when excavations reach depths as identified on Figure C, where contaminated materials are present. The EZs will encompass areas of active ground disturbing activities (i.e. open excavations) and may include any selected non-contaminated areas adjacent to the excavation areas to ensure worker safety. These non-contaminated areas may be utilized as contamination reduction zones (CRZ) for personnel exiting the EZs and entering the decontamination unit, or for staging of waste bags or equipment. The pathway on the ground inside the CRZ will be lined with polyethylene sheeting to ensure contamination is not spread onto a non-contaminated area. In some circumstances, the EZ may be moved (i.e., sliding EZ) to facilitate project activities. No adjustment to the EZ will occur without the approval of the PacifiCorp on-site representative. Asbestos warning signs will be posted on the EZ boundaries so that personnel may read the signs and take necessary protective steps before entering an EZ. All activities performed within the EZs will be performed in Level C personal protective equipment (PPE), as directed in the SHASP, unless specific modified procedures are cleared by the site HSM. Specific requirements regarding EZ setup will be finalized by the construction contractor(s) and HSM and documented in the construction contractor's health and safety plan and shall be in full compliance with the SHASP for the PacifiCorp Property.

Black (opaque) poly sheeting (minimum 6 mil. thickness) will be installed and securely fastened on the existing substation chain-link fencing to act as a visual barrier and maintained.

3.2.2 Decontamination Setup

In accordance with the SHASP, personnel decontamination will be evaluated on an area-specific basis, set-up and approved before ground disturbing activities commence. A properly demarcated three-stage decontamination unit will be established consisting of an equipment room or staging area, shower area, and a clean 'room' for personnel decontamination during contaminated soil removal. Personnel decontamination procedures will be posted in the clean room so that personnel may read and take necessary steps to ensure their safety. Modified decontamination procedures, consisting of the use of designated facilities such as boot wash and/or wash down stations, may be instituted if the area to be cleaned is, through agreement between EPA and PacifiCorp, considered small enough to warrant such. Potable water will be used for all personnel decontamination. Wastewater generated from personnel decontamination will be collected and passed through a 2-micron filter and discharged to the city POTW. Construction contractor(s) shall ensure any necessary permitting or approvals are in place and shall provide filtering equipment, in addition to necessary decontamination equipment/facilities.

Equipment pathway controls will be implemented. That is, the paths the equipment will traverse during the work will be controlled. These controls will be designed to minimize contamination of equipment during contaminated soil load-out. These controls may consist of, but are not limited to haul trucks driving over excavated pathways and covering truck dump boxes with 6-mil polyethylene sheeting to prevent contamination during contaminated soil loading. All haul truck exteriors will be fully decontaminated before leaving the site. A truck washing decontamination station will be established to ensure that haul trucks leaving the site are free of visible contamination. Specific requirements regarding the decontamination process for both personnel and equipment will be finalized by the construction

contractor and HSM and documented in the construction contractor's health and safety plan and shall be in full compliance with the SHASP for the PacifiCorp Property.

3.3 Soil Excavation

3.3.1 Contaminated Soil Removal

The construction contractor(s) or other identified contractor procured to conduct soil excavation work, such as a remediation contractor if required, will be responsible for selecting the appropriate equipment for conducting the excavations. Soil will be excavated to depths specified by the engineering drawings and PacifiCorp Project Manager for purposes of installing new facilities and removing existing facilities. It is anticipated that most excavation activities for foundations will be conducted using a backhoe and open pit method. There may also be instances where an auger would be used. Foundations have been designed to be installed at a depth of four (4) feet below ground surface with an over excavation depth of 5 feet below ground surface as described in Section 3.0. As such, it is not anticipated to encounter LA containing soils during installation of foundations located within the area of previous remediation activities and clean fill as delineated on Figure B of Appendix A. Figure B, in Appendix A, has been developed to indicate which foundations and ground disturbing activities will take place within clean-fill. If any vermiculite (LA) is observed during soil disturbance activities within areas of previous remediation activities, work will be stopped and appropriate measures implemented. The extents of contamination will be determined and appropriate work practices and handling procedures will be implemented.

When working in areas where clean fill material from the 2005 remedial activities has been imported, the clean fill will be treated as non-contaminated material to a depth of 12 inches above the previously excavated/cleaned depths as identified in Figure C. Any material, including clean fill, within 12 inches of the contamination depth or depth of previous excavation, will be treated as contaminated material. This safety factor is applicable not only to the bottom, but the sidewalls of the previously excavated/cleaned areas.

Soils consisting of any detectable LA shall be considered to be asbestos contaminated material and shall be disposed as asbestos contaminated material at an acceptable landfill. Clean, LA (asbestos) free soils will be used as fill material at the project site. In the event that contaminated soils are used as fill material, these areas will be documented and mapped.

3.3.2 Transportation and Disposal

Contaminated material will be excavated and live-loaded into trucks directly at the property, with care taken to prevent contamination of the trucks. 6-mil. polyethylene sheeting will line the inside of the truck bed to prevent any contaminated material from contaminating the outside edge of the truck bed during loading operations. Once the truck bed is filled, 6-mil. polyethylene sheeting will be utilized to cover over the top portion of the loaded waste. Prior to departing the property, trucks will have tarps secured over the beds. Controlled pathways will be constructed over uncontaminated property areas whenever possible so that trucks can be driven to the area(s) requiring excavation with minimal disruption. The utmost care will be given during loading to ensure that the truck exterior remains clean; however, trucks will be cleaned with water should the decontamination be warranted. Only authorized personnel will operate the mobile equipment. The construction contractor will ensure that all operators are fully trained to operate the equipment. All contractor personnel will be at least 2-hour asbestos awareness trained. All cleanup contractor personnel will have current 40-hour initial HAZWOPER training and annual 8-hour refreshers. Contaminated soils will be disposed of at Clean Harbors' Grassy Mountain Landfill or another appropriate

facility identified by the construction contractor(s) and appropriate disposal documentation and manifests shall be provided to PacifiCorp, EPA and UDEQ.

In the event that contaminated soil is to be temporarily stored onsite, prior to disposal, such soils will be placed on 6 mil. polyethylene sheeting, wetted if needed, and covered with the polyethylene sheeting. Roll-off units may also be used as a method of storage and transport of contaminated materials.

3.5 Air Sampling During Contaminated Soil Removal

3.5.1 Stationary Air Sampling

During contaminated soil removal/ground disturbing activities, the perimeter of the exclusion zone will be monitored for LA fiber migration by collecting stationary air samples at the exclusion zone boundaries. Stationary air sample calibration and collection procedures will be conducted in accordance with the SAP (Appendix C). Should perimeter air sampling indicate airborne off-site migration of LA, engineering controls (such as increased wetting of soils, etc.) will be undertaken.

3.5.2 Personal Breathing Zone Air Sampling

Personal breathing zone (BZ) air samples will be collected on personnel conducting contaminated soil removal to document that the level of respiratory protection is adequate for the task being conducted. All personal BZ sampling will be conducted in accordance with Appendix C. Tasks related to contaminated soil removal include, but are not limited to, water hose operator, excavator operator, vacuum hose operator, truck driver, and laborer. Personal BZ air sampling will consist of collecting one time weighted average (TWA) sample and one short-term exposure limit (STEL) (i.e., one 30-minute excursion) sample per job description, a minimum of once.

3.6 Removal Area Management

The property will be divided into the following work areas: ground disturbing activities, decontamination, and site support. The construction contractor will control the movement of personnel and equipment between the areas. These controls will keep the contaminants within specified areas, reducing the potential for contaminant migration. The construction contractor will establish, maintain, and clearly mark the work areas with appropriate signage and barricades.

3.6.1 Control of Surface Water

Responsibility for the care of surface water will be borne by the construction contractor until completion of work. The construction contractor will provide the materials and the equipment to perform all work necessary to facilitate the control of the surface water and to minimize water intrusion to open excavations. Using temporary control measures, the construction contractor will be responsible for preventing surface water from running into the contaminated area of the exclusion zones and contaminated water from running off site. Storm water will be controlled and diverted around the contaminated areas within the exclusion zones into the existing drainage systems and in accordance with any developed storm water plans for general permit compliance. As needed, the construction contractor will utilize mobile pump trucks to remove water that has come into contact with contaminated soils. This water will be filtered through 2-micron filters then discharged to the city storm sewer system upon approval. Surface water will be diverted as necessary.

Storm water and surface runoff which originates from areas where previous remediation occurred may be diverted off of the property to the city storm sewer system if in accordance with applicable storm water permits. Dikes for this purpose may be constructed using on-site material to control surface water runoff from cross-contaminating clean sections of the property. If necessary, portable pumps will be used to remove any ponded water prior to covering the excavation. Storm water management and any dewatering activities will also be in compliance with applicable plans and permits.

3.6.2 Pollution Prevention

Material will not be allowed to enter and pollute any surface water or groundwater in the project area. Vehicles and equipment will be lubricated or fueled in a controlled manner and in accordance with the applicable project plans such as a Storm Water Pollution Prevention Plan. All contractor personnel and subcontractors will comply with applicable federal, state, and local laws concerning pollution of surface and groundwater. Special measures may be implemented such as dikes around equipment that requires refueling on site, to prevent chemicals, fuels, oils, greases, and other materials from entering public waters. In the event of any spill of chemicals, oils, fuels, or hazardous wastes, such spills shall be immediately confined and remediated by construction contractor. Water used in personnel and washing of equipment that contacted contaminated material will be filtered through 2- micron filters prior to discharging to the city storm sewer system.

3.6.3 Dust Control

During the movement of any contaminated material, dust control measures will be maintained. This will primarily involve a full-time hose operator to keep soils damp and to prevent any visible emissions of dust. Except in areas where high voltage electrical equipment is located, the construction contractor will implement appropriate measures such as using water tankers with power spray units for dust control and a spray wash sprinkler for dust abatement when loading the soil. Dust abatement is a fundamental method in eliminating contaminant migration during excavation. Stationary air sampling at the exclusion zone boundary and visual observations will be conducted to evaluate dust control measures to ensure that fibers do not migrate outside the exclusion zone. All excavations, embankments, stockpiles, permanent and temporary access ways, waste staging and storage areas, stabilization materials handling areas, and other work areas may cause a dust hazard to others. Water sprinkling, chemical surfactant treatment (as approved by the PacifiCorp Project Manager and EPA), and plastic sheathing will be employed to control dust. Sprinkling will be repeated to keep the disturbed area damp at all times. Water trucks designed for this task or water hoses and sprinklers will be used. Dust control will be performed as the work proceeds and whenever a dust nuisance or hazard occurs. In accordance with state regulations, the construction contractor shall develop and adhere to a Fugitive Dust Plan.

3.6.4 Security

Security will be provided by the substation fence. The fence will be intact and all gates locked unless selected PacifiCorp representatives are present to ensure against unauthorized entry.

4.0 Progress Reporting

Weekly progress reports will be prepared by PacifiCorp's site agent. The weekly progress report will include tasks performed for the week, planned tasks for the following week, issues, and schedule summary. These reports will be electronically mailed to the EPA and the UDEQ. Laboratory sample results will be electronically mailed within 24-hours of receipt to the EPA and the UDEQ.

5.0 Schedule

Schedules will be prepared by PacifiCorp and the construction contractors and updated, as necessary, in the weekly progress reports. Once the Work Plan and associated documents have been approved by the EPA and the UDEQ, PacifiCorp shall provide a minimum of one week notice to the agencies prior to beginning any ground disturbing activities at the site. Construction activities are anticipated to commence in July of 2011 and last for a duration of approximately three months.

Appendix A Project Elements

Appendix A contains figures indicating the general location of new foundations to be installed, an aerial with schematic overlay indicating the general location of new facilities in relation to existing facilities and a proposed construction sequence. The construction sequencing has been developed to consolidate ground disturbing activities in an attempt to better facilitate control measure effectiveness. The construction sequence is considered to be in draft form and subject to change as needed.

Figure A Aerial and Schematic Overlay

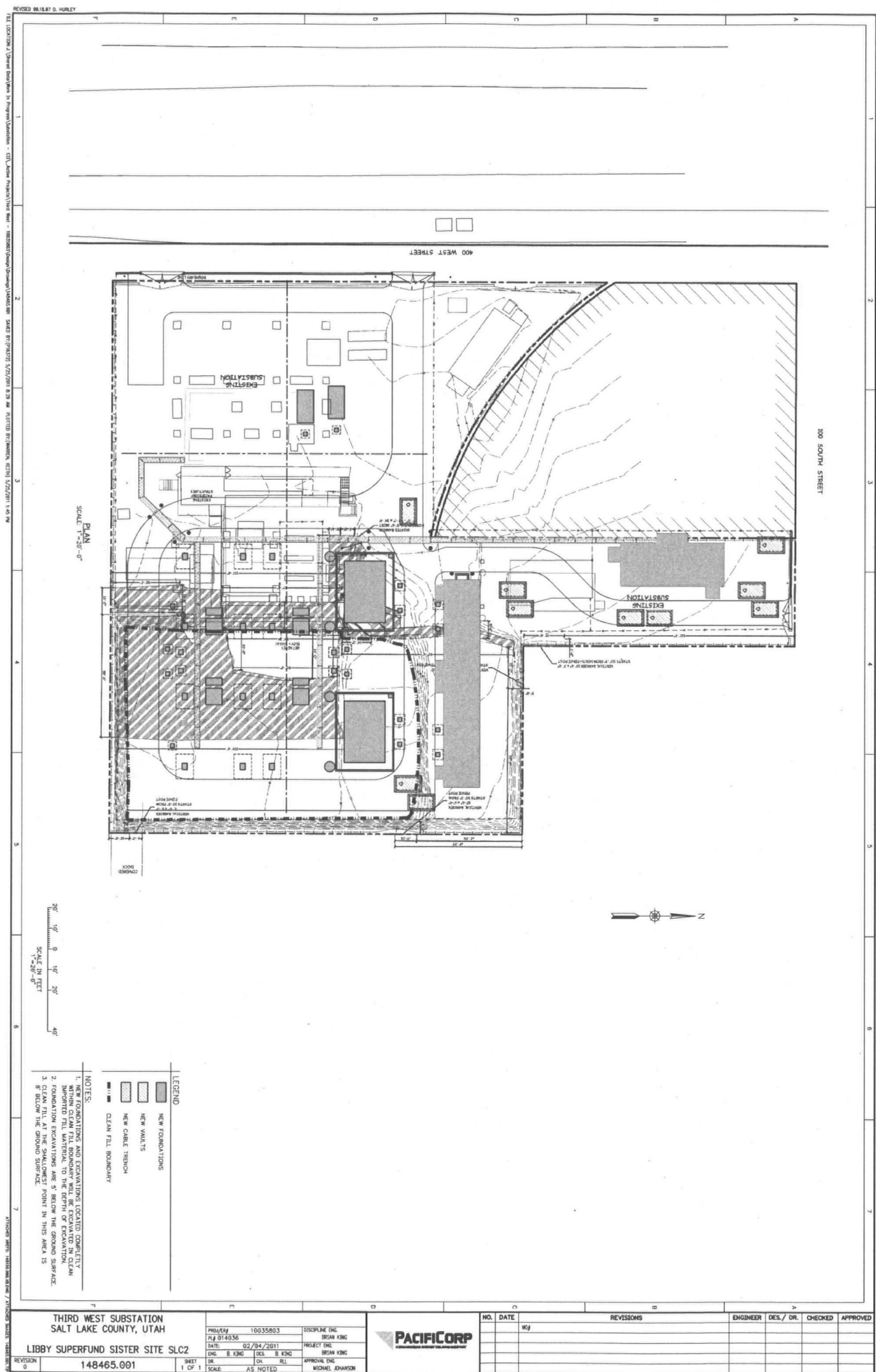


Figure C Barrier Drawing

LEGEND

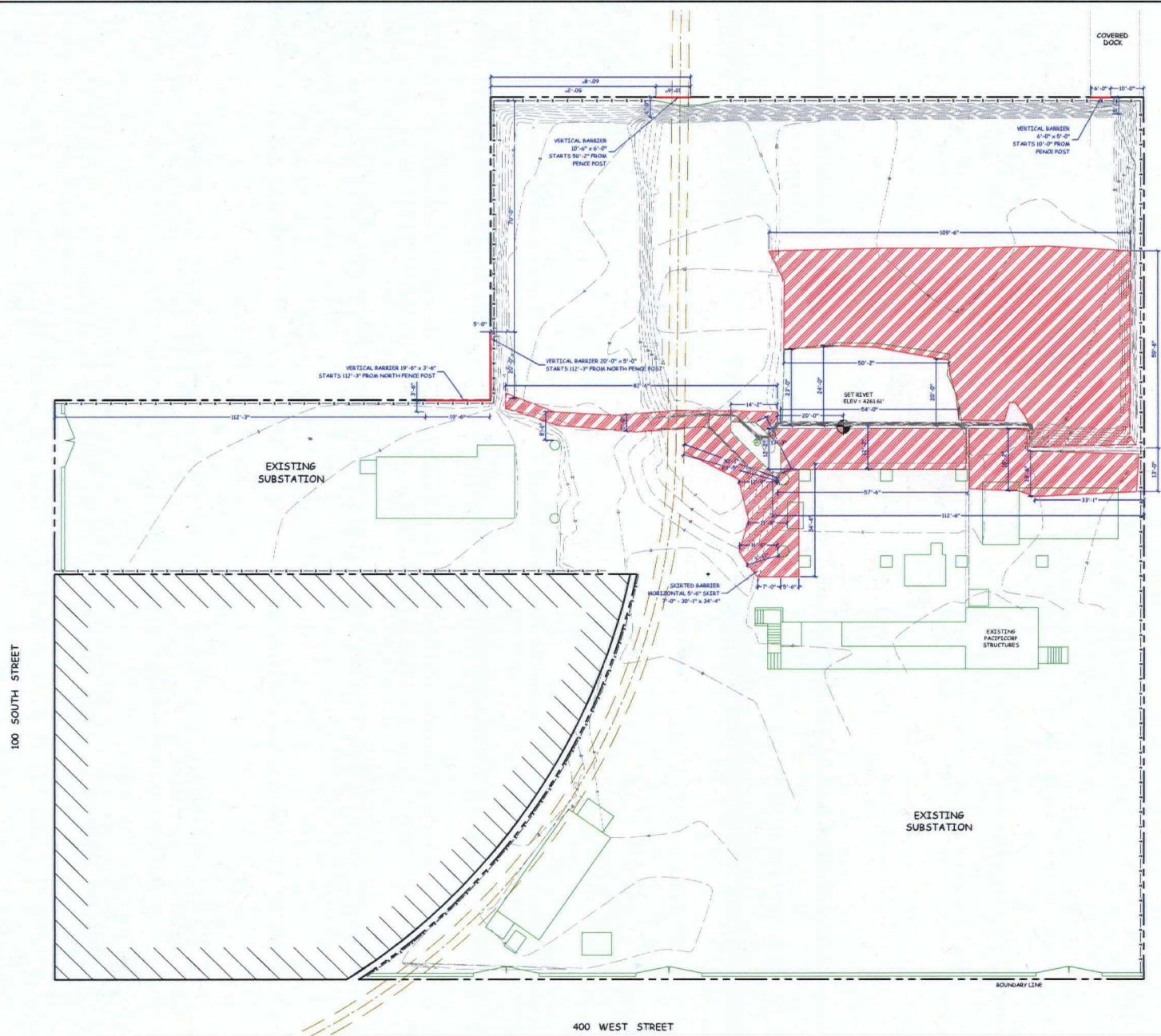
- EXISTING PUBLIC WORKS STRUCTURES
- PROPERTY BOUNDARY
- EXISTING PACIFICORP STRUCTURES
- AREA COVERED WITH BARRIER

GRAPHIC SCALE

(IN FEET)

1 inch = 15 ft.

NORTH



<p>R&R ENVIRONMENTAL, INC. 1407 West North Temple Salt Lake City, Utah 84116 Phone: 801.466.1111 Fax: 801.466.1112</p>	<p>PACIFICORP 1407 West North Temple Salt Lake City, Utah 84116</p>		PACIFICORP 3RD WEST SUBSTATION REMEDIATION PROJECT 2005		SCALE 1"=15'	PROJECT NO. 104-001R	SHEET NO. 7
			DRAWN T.R.B.	DATE 05/21/2005	DRAWING BARRIER DRAWING		

Third West Substation Construction Sequencing

Construction sequencing has been developed to limit construction duration of sub-grade work and to minimize the frequency of sub-grade construction activities and contact with LA contaminated soils. Sub-grade disturbance will be separated into two parts. Below is a high level construction sequence. Prior to construction, Contractor to submit actual detailed construction sequence and schedule to be approved by Project Management.

Prior to First Sub-Grade Disturbance

1. Install splice box for 12 strand fiber in vault 331 (eliminating loop-in to the substation).
2. De-energize the 46kV shunt capacitor bank and remove it (along with CBC40).
3. De-energize bank 6 (transformer and switchgear) and remove it (coordination with area planning required).
4. De-energize bank 7 (transformer and switchgear) and remove it (coordination with area planning required).
5. Open switches 52A and 58A. Switch 53A and VT#2 can be removed.
6. Open switch 51A. VT#1 and switch 52A can be removed along with the 46kV shunt capacitor disconnect switch. The fuses and feed to the old switchgear unit transformers can also be removed.
7. De-energize and remove the remaining 46kV bus east of the 46kV control building.
8. Remove the two 12.5kV shunt capacitor banks.
9. De-energize West Temple 46kV (north position) and Jordan 46kV. Open CBB54. Remove CB59, CB45, SW 51A, and associated switches, buswork, and getaways.

First Sub-Grade Disturbance

1. Remove the foundations/piers of all the equipment that was removed in the section above and backfill.
2. Perform site work.
3. Trench and install new ground grid.
4. Trench new 46kV route inside the substation. Take outages on the 46kV exiting the substation to the north and install the new vault and route.
5. Trench and install new duct bank for the 12.5 distribution from the existing man hole north. Remove the old duct bank from the existing man hole south. (Perform #6 at the same time if sidewalk/street work will be required)
6. Trench and install conduit for new 48 strand fiber
7. Excavate and pour new control building pad.
8. Excavate and pour new switchgear pad.
9. Excavate and pour new transformer pads.
10. Excavate and pour new 138kV circuit breaker pads.
11. Excavate and pour new 12.5kV shunt capacitor bank pads.
12. Excavate and pour 138kV bus supports and CCVT, foundations.
13. Trench and install conduit and cable trench
14. Trench and install 138kV transmission duct bank and conduit.
15. Trench and install 12.5kV distribution vaults, duct bank, and conduit.

Prior to Second Sub-Grade Disturbance

1. Install all new equipment including: switchgear, transformers, 12.5kV shunt capacitors, 138kV circuit breakers, 138kV CCVT's, 138kV bus supports and bus, 138kV switches, and control building.
2. Perform panel to panel wiring in the new control building.
3. Pull and terminate all outdoor 138kV control and power cable and the control and power cable to the new switchgear.
4. Pull all outdoor 46kV control and power cable and terminate at the YTC's.
5. Perform checkout of 138kV yard equipment, relays, etc.
6. De-energize 46kV Gadsby line.
7. Energize Jordan and Gadsby at 138kV.
8. Remove, CB59, CB48, and all their associated buswork (refer to engineering design and demolition plan).
9. De-energize 46kV to West Temple (east position), open CB47 and switch 56A.
10. Remove CBB54 and associated buswork.
11. Re-energize 46kV to West Temple. De-energize 46kV to Snarr.
12. Remove CB41. Re-energize 46kV to Snarr (after updating relay settings at Snarr).

Second Sub-Grade Disturbance

1. Remove the foundations/piers of all the equipment that was removed in the section above and backfill.
2. Remove the 46kV control building and abandoned switchgear building.
3. Remove the two building foundations and backfill.

Appendix B Scope of Work

Appendix B contains additional information (scope of work) that will be implemented by the construction contractor and other onsite workers procured by PacifiCorp to conduct the upgrade work at the PacifiCorp Property. This scope of work may be updated and built upon as needed and includes any items noted in the body of the Work Plan.

Scope-of-Work

The Company's environmental consultant will provide oversight of construction activities within contaminated areas. This consultant may perform such tasks as perimeter and personnel breathing air monitoring, as well as clearance sample collection, analysis, and reporting. Arrangements shall be made for Federal/State agency representatives to have complete site access, including exclusion zones, decontamination facilities, and the waste-PPE disposal stream, for the duration of the project. Representatives shall not enter the work zone unless they have been appropriately trained in asbestos awareness and are wearing all required PPE.

Site work will be divided into three distinct phases regarding activities that have the potential of encountering Libby Amphibole (LA) contamination of work and include the following:

- Interior dust removal prior to demolition or removal (Work Phase #1)
- Sub-grade disturbance activities (Work Phase #2)
- Demolition and removal of site structures (Work Phase #3)

I. Introduction

- A. This Scope of Work describes Contractor's responsibilities in the proper handling and disposal of LA-containing soils and dust anticipated to be generated during the Company's 3rd West Substation upgrade project, located at 333 West 100 South, Salt Lake City, Utah.

II. General Requirements

- A. Company shall ensure its employees are trained in electrical hazards associated with energized substations and that there is a designated on site electrical safety watchman observing activities at all times that Contractor's employees are inside the substation fence.
 - 1. Contractor's employees shall obey the safety watch on all issues concerning electrical safety.
- B. Contractor shall supply a job trailer or equivalent, to be used as an on-site office, which shall be placed on site prior to Contractor beginning work and shall remain until Contractor has completed the work described in this Scope of Work.
- C. Contractor shall maintain radio contact at all times with workers located inside the Exclusion Zones.
- D. Contractor shall provide sufficient chemical toilets on the job site for Contractor's personnel, and any authorized visitors. Contractor shall ensure these toilets are maintained appropriately and in a hygienic manner.
- E. Contractor shall provide all water necessary for completion of work described in this Scope of Work and obtain any associated permits/approvals regarding the acquisition/use of water and water discharge.
- F. Contractor shall supply all equipment necessary to produce and use controlled low pressure compressed air as needed for cleaning surfaces (removing LA dust) of energized electrical equipment.

- G. Contractor shall provide an English-speaking interpreter on-site any time Contractor personnel are non-English-speaking.
- III. Laws and Regulations
 - A. Contractor shall determine the extent of city, county, AQMD, state, federal and all other applicable laws and regulations.
 - B. Contractor shall perform the work in compliance with the most stringent regulations in effect for the work site.
- IV. Notifications and Fees
 - A. Contractor shall properly complete and submit all notifications required for performing the work and pay all required fees, including demolition notifications.
- V. Training and Certifications
 - A. In the performance of the work covered by this Scope of Work, Contractor shall employ only workers possessing current certification indicating successful completion of asbestos worker or asbestos contractor/supervisor training as described in 40 CFR 763.
 - B. Contractor shall employ only workers who have received training in Hazard Communication in accordance with 29 CFR 1910.1200.
 - C. Contractor shall employ only workers who have received training in Respiratory Protection in accordance with 29 CFR 1910.134.
 - D. Contractor shall, prior to commencement of work, produce, and have available on site for all Contractor-employed workers, training certifications, training records and respirator fit test records, as required by OSHA.
 - 1. Contractor shall keep these certifications and records available on demand at the work site for the duration of this project, as required by OSHA.
- VI. Personal Protective Equipment (PPE)
 - A. Contractor shall provide PPE for all its workers, consisting of Tyvek, or equivalent, over-suits, booties, and hoods; gloves impervious to asbestos fibers; hard hats; safety glasses; steel-toed shoes; and dual P-100 filter half-mask air-purifying respirators (or better).
 - B. PPE, as described in IV.A., above, shall be worn by Contractor's workers at all times while inside the control house or other structures or within exclusion zones with such a requirement, until work described in this Scope of Work is complete.
 - 1. Street clothes shall not be worn under Tyvek, or equivalent, over-suits.
 - C. Contractor shall establish a clean area immediately outside the control house or exclusion zones for donning and doffing PPE.
 - 1. Building ingress and egress shall be via an enclosed pathway (i.e., decontamination trailer) equipped to support proper personnel decontamination and air flow management.

VII. Work Activities with LA Materials

Interior dust removal prior to demolition or removal (Work Phase #1)

- A. Contractor shall establish negative pressure ventilation with HEPA (high efficiency particulate air) filtration in the building or structure. These structures include the control building (house), switch gear building, capacitor bank cabinets, switch gear cabinets, and other associated structures scheduled to be demolished or removed.
- B. All material, components, equipment, and supplies shall be bagged or wrapped and disposed of or HEPA vacuumed and/or wet-wiped to clean all dust and debris from exterior surfaces.
 - 1. Bagging and disposing of all 'non-value' items shall be accomplished first; then the 'value' items shall be cleaned and sealed.
 - 2. The cleaned material shall then be removed from the control house and placed in or on Company-provided trucks or trailers.
 - 3. Company representatives shall be on site to determine proper disposition of cleaned material removed from the control house basement.
- C. Contractor shall remove all settled dust and associated debris from both the upstairs and downstairs portions of the control house building or other site structures using vacuuming and/or wet wiping for all surfaces. A pressure washer may be used in the downstairs portion of the control building.
- D. Contractor shall wet-clean all surfaces other than those containing or immediately adjacent to electrical equipment.
 - 1. Contractor acknowledges that the control house contains electric panels and other energized electrical equipment and components which pose potential hazards. Use of controlled low pressure compressed air will be considered to clean debris and dust from these surfaces.
 - 2. Contractor shall exercise all due care and caution to avoid electrical hazards during his work.
- E. Removed LA-containing material (dust and debris) shall be cleaned up and bagged on a continual basis.
 - 1. Removed material shall be containerized, appropriately labeled and secured at the end of each work day. Any stockpiled contaminated soil contaminated with ACM that is stored overnight or longer, shall be covered, containerized, or chemically encapsulated to prevent any release of fibers.
 - 2. Contractor shall use a waste container that can be made secure from unauthorized disposal, so no extraneous waste is included with the waste generated by Contractor and no waste is removed from the container in an unauthorized manner.

Sub-grade disturbance activities (Work Phase #2)

- A. Contractor shall establish an exclusion zone around areas where sub-grade disturbance activities are anticipated to be undertaken. These activities include the removal of concrete and foundations, trenching (installing the grounding grid), boring (punching holes for the grounding grid), drilling, and excavation.

- B. A pressure washer or similar wetting device shall be used during the removal and/or disturbance of any LA-containing material (soil, dust and debris).
- C. Contractor shall wet-clean all surfaces other than those containing or immediately adjacent to electrical equipment.
 - 1. Contractor acknowledges that most areas and equipment contain electric panels and other energized electrical equipment and components which pose potential hazards. Use of controlled low pressure compressed air will be considered to clean debris and dust from these surfaces (as needed).
 - 2. Contractor shall exercise all due care and caution to avoid electrical hazards during his work.
- D. Equipment used in sub-grade disturbance activities shall be completely cleaned of any soil, debris, and/or contamination prior to removal from the exclusion zone. A pressure washer or similar wetting device could be used to clean any LA-containing material (soil, dust and debris). A common location near a site exit should be considered for all contamination cleaning to prevent recontamination of equipment and surrounding areas/personnel. Equipment may include shovels, drilling equipment, trenching machinery, heavy equipment (excavator, mini-excavator, loader, etc.), etc. Removed LA-containing material (soil, dust and debris) shall be cleaned up on a continual basis.
 - 1. Removed material shall be containerized, appropriately labeled and secured at the end of each work day.
 - 2. Contractor shall use a waste container that can be made secure from unauthorized disposal, so no extraneous waste is included with the waste generated by Contractor and no waste is removed from the container in an unauthorized manner.
 - 3. It is anticipated that a majority of the disturbed LA-containing material (soil, dust and debris) shall be maintained on-site (possibly used as fill) rather than disposed at an off-site location.
 - 4. Removed concrete, foundation components, or other large objects shall be power washed or cleaned prior to removal from the site.

Demolition and removal of site structures (Work Phase #3)

- A. Contractor shall establish an exclusion zone around areas where demolition and removal of site structure activities are anticipated to be undertaken. These activities include the demolition or removal of the control building (house), switch gear building, capacitor bank cabinets, switch gear cabinets, and other associated structures.
- B. A pressure washer or similar wetting device shall be used during the demolition or removal of any LA-containing material (soil, dust and debris).
- C. Contractor shall wet-clean all surfaces other than those containing or immediately adjacent to electrical equipment.
 - 1. Contractor acknowledges that most areas and equipment contain electric panels and other energized electrical equipment and components which pose potential hazards. Use of controlled low pressure compressed air will be considered to clean debris and dust from these surfaces (as needed).

2. Contractor shall exercise all due care and caution to avoid electrical hazards during his work.
- D. Equipment used during demolition or removal activities shall be completely cleaned of any soil, debris, and/or contamination prior to removal from the exclusion zone. Equipment will likely include heavy equipment (excavator, mini-excavator, loader, etc.). Removed LA-containing material (soil, dust and debris) shall be cleaned up on a continual basis.
1. Removed material shall be containerized, appropriately labeled and secured at the end of each work day.
 2. Contractor shall use a waste container that can be made secure from unauthorized disposal, so no extraneous waste is included with the waste generated by Contractor and no waste is removed from the container in an unauthorized manner.
 3. It is anticipated that a majority of the disturbed LA-containing material (soil, dust and debris) shall be maintained on-site (possibly used as fill) rather than disposed at an off-site location.
 4. Removed concrete, foundation components (walls/foundation), or other large objects shall be power washed or cleaned prior to removal from the site.

VIII. Personnel Monitoring

- A. Contractor's personnel shall wear personal sampling pumps, provided by the Company's Consultant, in order to allow the Company's Consultant to conduct personnel breathing-zone air monitoring each day of the work.

IX. Transport and Disposal of Waste

- A. Contractor shall transport all waste in leak-tight containers, in poly-lined, enclosed vehicles.
1. Contractor shall ensure vehicles transporting waste are be appropriately marked.
 2. Contractor shall ensure vehicles transporting waste carry all required shipping papers and that these shipping papers are completely and appropriately filled out.
- B. Contractor shall transport all waste generated during the performance of work described in this scope of work to a landfill permitted to accept the type of waste generated.
1. Contractor shall complete all paperwork and pay all fees associated with the disposal of this waste.

X. Completion of Work

- A. Clean-up work or ground disturbing work shall be considered finally complete after the work has been completed and when areas successfully pass aggressive air monitoring clearance tests following the activities described in VII Work Activities with LA Materials, above.
1. Aggressive air monitoring clearance tests shall be performed in accordance with the SAP (Appendix C).
 2. The upstairs area and the basement area of the control house shall be considered separate airspaces.
 3. Five (5) individual air samples shall be taken from each separate air space.
 4. Areas shall be considered clean when zero (0) Libby Amphibole fibers are detected in all air clearance samples when analyzed by TEM (ISO 103120).

- B. The work covered by this Scope of Work shall be considered complete when air monitoring described in X, Completion of Work, above, has been successfully completed; all materials, tools, and equipment brought on site by Contractor have been removed from the site, site is stabilized, and all waste generated in the performance of this work has been removed from the site and properly disposed of

Appendix C Sampling and Analysis Plan

Appendix D Site Health and Safety Plan

APPENDIX C

Sampling and Analysis Plan (SAP) for 3rd West Substation "2011 Upgrade Project" Salt Lake City, Utah

May 2011



Prepared for:
Brian King
1407 West North Temple
Salt Lake City, Utah 84116
brian.king@pacificorp.com
(801)220-4831

Prepared by:
David C. Roskelley, MSPH, CIH, CSP
R & R Environmental, Inc. (R & R)
47 West 9000 South, Suite #2
Sandy, Utah 84070
dave@rrenviro.com
Phone (801) 541-1035

Acronyms

°F	degrees Fahrenheit
AHERA	Asbestos Hazard Emergency Response Act
bgs	below ground surface
BZ	breathing zone
CAR	corrective action request
COC	chain-of-custody
DQA	data quality assessment
DQO	data quality objectives
EDD	electronic data deliverables
EPA	(United States) Environmental protection Agency
EZ	Exclusion Zone
f/mm ²	fibers per square millimeter
FSDS	field sample data sheets
GPS	global positioning system
Grace	W.R. Grace Company
HASP	health and safety plan
IDL	instrument detection limit
LA t	remolite, actinolite, richterite, and winchite
NA	not applicable
ND	non-detect
NVLAP	National Voluntary Laboratory Accreditation Program
OSC	On-Scene Coordinator
PCME	PCM Equivalent
PE	performance evaluation
PLM	polarized light microscopy
PM	project manager
PPE	Personal Protective Equipment
QA	quality assurance
QAM	Quality Assurance Manager
QC	Quality Control
QMP	Quality Management Plan (see Order on Consent)
R&R	R&R Environmental, Inc.
SAP	Sampling and Analysis Plan
WP	Work plan
SOP	Standard Operating Procedure
TWA	Time Weighted Average

Section 1

Introduction

This document serves as the sampling and analysis plan (SAP) associated with the upgrade work at the PacifiCorp property known as the 3rd West Substation. This plan is to be implemented in conjunction with the Work Plan (WP) developed for upgrade activities to take place on the property. This SAP outlines the sampling and analysis to be conducted during disturbance of the existing substrate contaminated with Libby Amphibole (LA).

This section provides a general explanation of the purpose of the SAP for the WP and organization of this document. An expanded site background is available (3rd West Substation Site History Report, dated March 26, 2004); a brief history is provided in Section 2. The activities being completed at the PacifiCorp Property include the removal of soil, buried foundation materials and encountered LA contaminated soil/dust from enclosed substation equipment identified for demolition. In addition LA contaminated soils may be encountered during removal of existing substation facilities and the installation of new facilities. The contamination encountered at the property is due to historic vermiculite processing, handling and transportation. The approach to the disturbance of these media is found in the text of the WP located in the main body of this document. During work on the properties, sampling and analysis is conducted to ensure the health and safety of the workers at the site and the public in the vicinity of the site. This includes air sampling and analysis during the work to confirm that the safety of the workers and the public is maintained throughout the project.

This SAP outlines the field sampling plan as it pertains to sampling completed during and after soil excavation and disturbance. The purpose of this SAP is to describe the sampling objectives, locations, measurement methods, and the quality assurance (QA) requirements for air sampling during construction efforts. The SAP is organized as follows:

Section 1 - Introduction

Section 2 - Site Background

Part I: Field Sampling Plan (FSP)

Section 3 - Sampling Strategy, Locations, and Rationale

Section 4 - Field Activity Methods and Procedures

Part II: Quality Assurance Project Plan (QAPP)

Section 5 - Project Management

Section 6 - Measurement and Data Acquisition

Section 7 - Assessment and Oversight

Section 8 - Data Validation and Usability

Section 9 - References

Appendix A-1 - Standard Operating Procedures

Appendix A-2 - Air Sample Collection Procedures

Appendix A-3 - Request for Modification Forms

1.1 Objectives

This section defines objectives of the air monitoring, and the intended use of the data. The primary objective of these efforts is to determine the presence of LA in the air during and after soil excavation at the PacifiCorp Property. The specific objectives are to:

- Sampling during excavation - stationary air sampling to ensure that excavation is not spreading asbestos into the air
- Sampling after removal - stationary air to ensure what remains meets background standards as defined by EPA.
- Sampling throughout excavation - breathing zone air sampling, a health and safety measure, to ensure workers are not being exposed to asbestos
- Sampling will be ongoing for the duration of the ground disturbing activities at the site, which are anticipated to last several months and occur intermittently.

1.2 Project Schedule and Deliverables

The results of the SAP will be maintained onsite and available to agencies upon request. The sampling results will be maintained by PacifiCorp and the onsite Health and Safety Manager (HSM). Other project deliverables and schedules are discussed in the main body of the WP for this work. Sampling results will be e-mailed within 24-hours of receipt to EPA and UDEQ.

Section 2 Site Background

This section describes the site location and the history.

2.1 Site Location

The PacifiCorp Property is located at 147 South 400 West, Salt Lake City in Salt Lake County, Utah. The site includes energized high voltage electrical equipment typical of an electric utility substation. Certain areas of the property are contaminated with asbestos fibers as a result of historic vermiculite handling and processing conducted in the area in years past.

2.2 Site History

A detailed history of the PacifiCorp Property site is available in a document entitled "3rd West Substation Site History Report", dated March 26, 2004. A portion of the PacifiCorp property and other nearby sites served as a transfer point and processing (expansion) area for vermiculite from Libby, Montana. Expansion (also known as "exfoliation" or "popping") was accomplished by heating the ore, usually in a dry kiln, to approximately 2,000 degrees Fahrenheit (°F). This process explosively vaporizes the water contained within the phyllosilicate structure causing the vermiculite to expand by a factor of 10 to 15. This produces the vermiculite material most commonly sold as thermal insulation and as soil conditioner for gardens and greenhouses. The commercially exploited vermiculite was used in a variety of products, including insulation and construction materials, as a carrier for fertilizer and other agricultural chemicals, and as a soil conditioner.

According to Andrew Schneider and David McCumber, in "An Air that Kills: How the Asbestos poisoning of Libby, Montana uncovered a National Scandal", Libby Amphibole (LA) is a combination of rare asbestiform minerals that formed when a plume of magma rose up from the earth's mantle, pushed through the sedimentary deposits of the area, stopping about a mile below the surface. As the plume and subsequent plumes cooled, biotite was formed. Biotite is an unstable mineral, which, because of the abundant water available, metamorphosed into tremolite asbestos and other LA suite minerals. After tens of millions of years, vermiculite formed due to erosion and weathering.

During 2004 and 2005, approximately 24,000 cubic yards of material were removed from the site under abatement conditions. Afterwards, approximately 17,000 cubic yards of clean fill was brought in to fill the excavated areas and compacted on the site.

Part I: Field Sampling Plan

Section 3

Sampling Strategy, Locations, and Rationale

The field sampling plan (FSP) is included in Sections 3 and 4. This section describes the overall strategy for sampling conducted during work activities.

3.1 Sampling Strategy

All native soil within the work area will be presumed to be contaminated. There are areas of clean fill or no contamination within the work area, consistent with previous clean up actions. However, in order to minimize exposure, sampling/monitoring will take place throughout the duration of ground disturbing activities at the site. Air sampling will be conducted to ensure exposures are within OSHA guidelines.

3.1.2 Stationary Air Monitoring

During contaminated soil disturbance, the perimeter of the cardinal compass points will be monitored for asbestos fiber migration by collecting stationary air samples at the exclusion zone boundaries. Daily perimeter monitoring will be conducted in calm weather at the compass points (north, east, south and west).

3.1.3 Personal Breathing Zone Monitoring

Personal breathing zone (BZ) air samples will be collected on personnel conducting soil disturbance to document that the level of respiratory protection is adequate for the task being conducted. Sampling frequencies for personal BZ air monitoring shall be representative of each unique job task relative to the work force involved with ground disturbing activities.

3.2 Quality Assurance/Quality Control (QC) Samples

The QA/QC measures taken for confirmation clearance air sampling include analysis of field and/or laboratory QC samples, verification of analytical results through alternative methods, and laboratory systems audits and performance monitoring through the National Voluntary Laboratory Accreditation Program (NVLAP). Laboratory QA/QC must adhere to method requirements unless defined differently in this SAP. At the discretion of the appropriate EPA representative involved with this project, data generated by polarized light microscopy (PLM) may be verified through alternative analytical methods, which are currently being developed by EPA in a performance evaluation study. If at any point this step is required, direction will be provided in the form of an addendum memorandum or modification form to this SAP. Individual QA/QC requirements for each sample type are described below. Note that QC samples will not be used in decision making; rather, QC samples will only be used to assess the precision and accuracy of the field sampling and analysis efforts and to understand whether biases exist in the data as a result.

3.3 Clearance (Confirmation) Air Sample QC

Individual QA/QC requirements for air samples taken as part of the clearance assessment are defined below and summarized in Table 3-t:

Lot Blanks. Lot blanks are prepared by submitting unused cassettes for analyses prior to putting the group (lot) of cassettes into use. Lot blanks will be collected and analyzed at a frequency of 2 per 100 cassettes from the same lot. The lot blanks will be analyzed by each of the following methods: NIOSH 7400 and TEM AHERA. Lot blanks will be identified on the chain-of-custody (COC) form, so that the analytical laboratory is aware of their use and can contact the laboratory coordinator immediately if asbestos fibers are detected on the filters. If the lot is proved to be contaminated with 7 or more fibers per cubic millimeter by NIOSH 7400, or 1 or more LA structures per square millimeter by TEM AHERA, then the lot of cassettes will be discarded and a new lot of cassettes will be used.

Field blanks should be divided into two categories, those relating to clearance (confirmation) air samples and those relating to other air samples including breathing zone and stationary monitoring. Regardless of the type of field blank, they are all collected by removing the cap from the sample cassette at the time of sampling for not more than 30 seconds and then replacing the cap.

Field Blanks, Clearance Air Samples. 2 field blanks will be collected daily (i.e. grouping of foundation excavations). The field blanks will come from the same lot as the cassettes used that day for air sample collection. Both of the field blanks will be collected in the work zone, but in the vicinity of the location the ambient air samples are collected. The field blanks will be analyzed by TEM AHERA. If a field blank is contaminated with 1 or more LA structures per square millimeter, then the HSM will determine whether the occurrence displays a trend in contamination or is isolated. The HSM will also decide whether analysis of other archived field blanks is necessary. If it is determined that additional archived field blanks require analysis, they will be retrieved from archive at the analytical laboratory and analyzed. Field blank results will be evaluated to determine if field blank contamination is a sample collection procedure deficiency. If at any time field blank contamination appears to be a consistent deficiency in sample collection technique, PacifiCorp or the HSM may immediately recommend additional formalized sample collection training and/or an increase in the frequency of field blanks submitted for analysis. If this is implemented, direction on required frequency, acceptance criteria, and corrective action will be provided in the form of an addendum memorandum or modification form to this SAP.

Field Blanks, Breathing Zone/Stationary Air Monitoring Samples. One field blank will be collected per day of air sampling. The field blank cassettes will come from the same lot as the cassettes used that day for air sample collection. One field blank will be analyzed per week. The remainder of the field blanks collected, but not analyzed, will be submitted to the analytical laboratory marked for archive. The field blanks will be analyzed by each of the following methods: NIOSH 7400 for breathing zone monitoring field blanks or TEM AHERA for stationary monitoring field blanks. The field blanks sample results will be reviewed by the HSM. If a field blank is contaminated with 7 or more fibers per cubic millimeter by NIOSH 7400, or 1 or more LA structures per square millimeter by TEM AHERA, then the HSM will determine whether the occurrence displays a trend in contamination or is isolated. The HSM will decide whether analysis of other archived field blanks is necessary. If it is determined that additional archived field blanks require analysis, they will be retrieved from archive at the analytical laboratory and analyzed. Field blank results will be evaluated to determine if field blank contamination is a sample collection procedure deficiency. If at any time field blank contamination appears to be a consistent deficiency in sample collection technique, PacifiCorp or the HSM may immediately recommend additional formalized sample collection training and/or an increase in the frequency of field blanks submitted for analysis. If this is implemented, direction on required frequency, acceptance criteria, and corrective action will be provided in the form of an addendum memorandum or modification form to this SAP.

Table 3-1 QC Sample Requirements for Clearance (Confirmation) Air Samples

QC Sample	Air Sample Type	Frequency	Acceptance Criteria (b)	Corrective Action
Lot Blank	Final Clearance Personal Breathing Zone Stationary	2 per 100 cassettes of the same lot number (a)	1. Analyze & apply acceptance criteria prior to ever using the cassettes for sample collection. 2. <7.0 f/mm3 (method detection limit using NIOSH 7400) 3. ND for LA (TEM AHERA with site-specific modifications)	Do not use the lot of cassettes for sampling if acceptance criteria are not met.
Field Blank	Final Clearance	2 per work area - 2 field blanks collected per NPE, one will be analyzed and one will be archived	ND for LA (TEM AHERA with site-specific modifications)	Analyze archived blank to determine if contamination on first blank is an isolated occurrence. If the contamination in the field blank does not appear to be a trend, no action is required. If a trend in contamination is apparent, re-train the sampler(s) and continue to monitor the problem until resolved. Field blanks contaminated with LA will be considered when determining if the work area meets final clearance criteria (i.e., if re-cleaning and clearing the work area is warranted).
Field Blank	Breathing Zone Perimeter Monitoring	1 per day of air sampling.	1. <7.0 f/mm2 (Method Detection Limit using NIOSH 7400) (b) 2. ND for LA	Evaluate the field blank results to determine if contamination is an isolated occurrence. If the

			(TEM AHERA with site-specific modifications)	contamination in the field blank does not appear to be a trend, no action is required. If a trend in contamination is apparent, re- train the sampler(s) and determine if an increase in the frequency of field blanks analyzed is required. Associated field sample results may be qualified. If necessary, other field blanks collected by the sampler should be retrieved from archive and analyzed.
--	--	--	--	---

f/mm² fibers per square millimeter

ND non-detect for Libby Amphibole

NPE negative pressure enclosure

(a) Frequency requirements are based on the lot number, not on the air sample type.

(b) Acceptance criterion is based upon calculations that assume 5.5 fibers per 100 fields analyzed by NIOSH 7400

Section 4

Field Activity Methods and Procedures

The following is a summary of field activities that will be performed by the PacifiCorp contracted qualified consultant or HSM for air sampling:

- Mobilization
- Procurement of equipment and supplies
- Documentation of field activities
- Photographic documentation
- Field sampling methods and procedures
- Decontamination procedures

4.1 Mobilization

Prior to the mobilization for field activities, a field planning meeting will be conducted by the HSM and attended by the construction contractor (Contractor) and consultant, if different than the HSM. The agenda will be reviewed and approved by the PacifiCorp Project Manager prior to the meeting. The meeting will be to briefly discuss and clarify:

- Objectives and scope of the fieldwork
- Equipment and training needs
- Field operating procedures, schedules of events, and individual assignments
- Required QC measures
- Health and safety requirements
- Documents governing fieldwork that must be on site
- Any changes in the field plan documents

An attendance list will be signed by participants. Copies of these documents will be maintained by the HSM and provided to PacifiCorp. Additional meetings will be held when the documents governing fieldwork require it or when the scope of the assignment changes significantly.

The field team personnel will perform the following activities before and during field activities, as applicable:

- Review and understand the FSP and site health and safety plan (SHASP)
- Ensure that all sample analyses are scheduled through the designated laboratory
- Obtain required sample containers and other supplies
- Locate hospital
- Obtain and check field sampling equipment
- Obtain appropriate personal protective equipment (PPE)
- Turn samples with chain of custody over to the HSM

4.2 Equipment, Supplies, and Sample Containers

The equipment listed below will be required for sampling activities.

Air sampling:

- Low flow pumps
- Low flow pump charger
- Primary calibration instrument (dry cal)
- Cassette stands
- 20-inch box fan
- 1 horsepower leaf blower (used for possible aggressive sampling)
- 0.8 μ m pcm cassettes
- Teflon tape
- Extension cords
- Rotometer
- GFCI three way extension splitter
- Tygon tubing
- Calculator
- Rubber made storage boxes
- Kneepads
- Utility knife
- Tape measure
- Compass
- Ballpoint pens
- Permanent markers
- Duct tape
- Nitrile gloves
- Alcohol wipes
- High volume pumps
- Flow regulators
- Nylon leur adapter
- 0.45 microvac cassettes
- Clipboard
- Logbooks
- Scissors
- File tote
- Paper towels
- Digital camera

4.3 Field Documentation

Information and notations will be recorded as required in the applicable field logbook. In addition, field sample data sheets (FSDSs) will be completed for each sample in order to capture pertinent tracking information, such as sample date and time, and specific location. To ensure that sample information is consistent and retrievable from the site and database, all field sampling personnel will be instructed on proper FSDS completion by the HSM prior to field work.

4.4 Field Instrument Calibration and Maintenance

No field measurements will be collected during this inspection and, therefore, no field instruments will be used.

4.5 Photographic Documentation

Photographs will be taken with a digital camera at any place that the field sampling personnel determine necessary. Electronic photo files will be saved each day to a project-designated computer housed on-site and named so that photos for a particular activity (e.g., bulk substrate removal, interior dust removal, etc.) can easily be retrieved.

Following completion of ground disturbing activities, all photo files pertaining to a property will be copied onto a CD and filed along with other property-specific documentation.

4.6 Field Sampling Methods and Procedures

The SHASP should be consulted to determine health and safety protocols for performing site work. Prior to initiating field activities, the HSM will review and discuss the SAP and SHASP with the contractor and consultant. The contents of each Appendix are listed below.

Part II: Quality Assurance Project Plan

Section 5

Project Management

This SAP supports the WP for the PacifiCorp site. This SAP was prepared in accordance with EPA Requirements for Quality Assurance Project Plans for Environmental Data Operations, QA/R-5, Final (EPA 2001). This section covers the basic area of project management, including the project organization, background and purpose, project description, quality objectives and criteria, special training, and documentation and records.

5.1 Project Organization

Organization and responsibilities specific to this removal action are discussed in this section. R&R will provide the necessary technical and field staff to perform reporting aspects of the project. Analytical services are provided through a contract laboratory.

5.1.1 EPA Region VIII

The EPA representative is PacifiCorp's primary federal agency contact for coordinating removal of encountered contaminated material and conducting work at the PacifiCorp Property. This contact is responsible for the management and coordination of the following activities:

- Defining data quality objectives
- Reviewing all project deliverables
- Maintaining communications with the PacifiCorp project manager for updates on the status of the project
- Provide for technical review and the return of consolidated comments on the various technical documents submitted for review
- Act as the lead Federal agency for the project

5.1.2 PacifiCorp

The PacifiCorp project manager (PM), Mr. King, is the primary contact for coordinating removal of encountered contaminated material and working within proximity to contaminated materials at the PacifiCorp Property. Mr. King is responsible for the management and coordination of the following activities:

- Defining the sampling scope
- Defining data quality objectives
- Reviewing all project deliverables
- Reviewing monthly status reports
- Providing oversight of the sampling
- Assuring that plans are implemented properly
- Informing personnel of any special considerations associated with the project
- Providing site access, if necessary
- Reviewing work progress for each task
- Reviewing and analyzing overall performance with respect to goals and objectives

5.1.3 R&R Environmental, Inc. (R&R)

The R&R management team will be comprised of the following positions: Health and Safety Manager (HSM) and project Quality Assurance Manager (QAM).

The following personnel are assigned to this project:

Health and Safety Manager David Roskelley

Quality Assurance Manager Eldon Romney

Mr. Roskelley, as HSM, is responsible for the overall management and coordination of the following activities:

- Maintaining communications with EPA and PacifiCorp regarding the status of this project
- Supervising production and review of deliverables
- Reviewing analytical results
- Tracking of planned budgets and schedules
- Procuring non-laboratory subcontractors, when necessary
- Providing oversight of data management
- Using sampling data in site exposure decision making
- Preparing monthly status reports
- Reviewing analytical results
- Overseeing operation and maintenance activities
- Scheduling personnel and material resources
- Providing oversight of daily and periodic report preparation
- Coordinating work activities including sampling
- Notifying the responsible QA staff immediately of significant problems affecting the quality of data or the ability to meet project objectives
- Implementing field aspects of the project, including this SAP and other project documents
- Organizing and conducting periodic meetings with onsite facility personnel
- Implementing the QC measures specified in R&R's Quality Management Plan (QMP) (R&R 2003a) and other project documents
- Implementing corrective actions resulting from staff observations, QA/QC surveillances, and/or QA audits
- Ensuring that sampling is conducted in accordance with pertinent R&R SOPs and that the quantity and location of all samples meet the requirements of this SAP
- Scheduling and conducting required sampling and monitoring activities
- Preparing and shipping samples to the analytical laboratories
- Ensuring electronic data entry from FSDSs into the onsite sample tracking database
- Generating COC forms and ensuring adherence to sample custody procedures (e.g., use of custody seals by the samplers)
- Coordinating with the laboratories regarding sample deliveries/shipments and following up with result reporting
- Receiving and distributing air monitoring and soil confirmation sample results to The PM, the OSC and removal oversight personnel, as applicable

Mr. Roskelley is also responsible for ensuring transmittal of project documentation to PacifiCorp and to the project file repositories.

5.1.4 Quality Assurance Organization

The QA Manager, Mr. Eldon Romney, implements the QA program. The QAM is independent of the technical staff and is the president of R&R. The QAM thus has the authority to objectively review

projects and identify problems and the authority to use corporate resources as necessary to resolve any quality-related problems. Mr. Romney is also responsible for the following:

- Verifying that corrective actions resulting from staff observations, QA/QC surveillances, and/or QA audits are implemented
- Reviewing and approving the project-specific plans
- Directing the overall project QA program
- Maintaining QA oversight of the project
- Reviewing QA sections in project reports, as applicable
- Reviewing QA/QC procedures applicable to this project
- Auditing selected activities of this project performed by R&R and contractors, as necessary
- Initiating, reviewing, and following up on response actions, as necessary
- Maintaining awareness of active projects and their QA/QC needs
- Determining appropriate QA/QC measures and corrective actions
- Conducting internal system audits to check on the use of appropriate QA/QC measures, if applicable
- Arranging performance audits of measurement activities, as necessary
- Providing monthly written reports on QA/QC activity to the PM

5.2 Quality Objectives and Criteria for Measurement

This section provides internal means for control and review of the project so that environmentally related measurements and data collected are of known and acceptable quality. The subsections below describe the data quality objectives (DQOs) (Section 5.4.1) and data measurement objectives (Section 5.4.2).

5.2.1 Data Quality Objectives (DQOs)

To accomplish the project goals, the WP/SAP calls for the sampling and analysis of a variety of media for various purposes. For convenience and to clarify the specific purpose of each sampling and analysis program, the DQOs are organized separately by medium and respective purpose. Whenever possible, this is accomplished in tabular form. As shown, the various DQOs are segregated into the following: (1) Personal Air (BZ) Samples, (2) Perimeter Monitoring Air Samples

Step 1: State the Problem

Identify the planning team members including the decision makers:

All project personnel are detailed in Section 5.1. The decision makers for the activities described in this SAP are (EPA OSC), King (PacifiCorp PM), and David Roskelley (HSM).

Describe the problem:

Previous studies were designed to characterize LA contamination at residential and commercial properties in and around Libby, Montana. Removal activities were performed at residential and commercial properties that were found to contain LA asbestos-contaminated VCI, interior dust, and/or exterior soils. During removal activities on those properties

(i.e., excavation of contaminated soil), the potential for LA fibers to migrate offsite increased. Likewise, during those activities, the potential for LA exposure to workers also increased. This experience indicates it is important to ensure worker safety and contaminant containment through periodic monitoring. Following cleanup, confirmation samples must be collected and analyzed expeditiously to determine if the removal actions met

project goals. Therefore, a program must be put in place to monitor: (1) worker exposure and contaminant containment during removal activities; and (2) the effectiveness of the decontamination (i.e., confirmation) following disturbance activities.

Determine resources:

R&R's current task order under PacifiCorp provides a detailed description of resources, budget, and schedule for sampling and analysis response activities.

Step 2: Identify the Decision

Identify the principle study question, alternative actions, and decision statements:

The principle study question(s), alternative actions, and decision statements are summarized in Table 5-1.

Table 5-1 Identify the Decision

Data Quality Objective	Sample Description	Principle Study Question(s)	Alternative Actions	Decision Statements
RA Monitoring	Personal (BZ) Air Monitoring	Is LA detected in the workers' breathing zone above worker safety limits?	1. Continue contaminated soil disturbance and re-evaluate engineering controls, work practices, and/or PPE 2. Stop work 3. Take no action	Are LA fibers collecting in the workers' breathing zone above worker safety limits? If yes, engineering controls, work practices, and/or PPE will be re-evaluated and/or work will stop. If no, cleanup activities will continue with no additional evaluation.
RA Monitoring	Perimeter Air Monitoring	Are LA fibers detected in air along the perimeter of the exclusion zone boundary of an exterior work site?	1. Continue contaminated soil disturbance and re-evaluate engineering controls and work practices 2. Take no action	Are LA fibers migrating to the exclusion zone boundary during LA contaminated soil disturbance? If yes, engineering controls and/or work practices, will be re-evaluated and/or work will stop. If no, excavation activities will continue with no additional evaluation.

RA Removal Action
 BZ Breathing Zone
 NPE Negative Pressure Enclosure
 PPE Personal Protective Equipment

Step 3: Identify the Inputs to the Decision

Identify the information needed. Determine the basis for determining the Action Levels.

Identify sampling and analysis methods that can meet the data requirements.

The information needed for the decision, the action levels, the basis for the action levels, and analytical method summaries are provided in Table 5-2.

Analytical results (that are confirmatory and do not serve to characterize contamination) are needed within hours of sampling so that excavation/cleanup work may continue with relative continuity. As such, confirmation soil samples will not be ground and will be analyzed via PLM NIOSH 9002.

Table 5-2 Inputs to the Decision

Data Quality Objective	Sample Description	Information Needed	Action Level	Basis for Action Level	Analytical Method
RA Monitoring	Personal Breathing Zone Air Monitoring	Reported Result: ASPCM: 1 f/cc ASTEM: 0.005 S/cm ³ Min. Volume: 25 L (a) Collect: TWA: 8-hour STEL: 30-minute excursion sample	TWA: 0.1 PCME f/cc STEL: 1.0 f/cc	OSHA Worker Safety Regulations (1926.1101)	PCM: NIOSH 7400 TEM(d): TEM AHERA with site-specific modifications 24-Hour Turn-Around-Time
RA Monitoring	Perimeter Air Monitoring	ASTEM: ~0.005 S/cm ³ Min. Volume: 1200 L Collect: 4 samples, min. along north, south, east & west boundaries of EZ	Each air sample <ASTEM Any LA fibers	Removal Action Clearance Criteria (b)	TEM AHERA with site-specific modifications 24-Hour Turn-Around-Time

AS Analytic Sensitivity al

L Liters

RA Response Action

ND Non-detect

VAE visual area estimation

f/cc fiber per cubic centimeter

S/cm³ Libby Amphibole structures per cubic centimeter of air

TEM AHERA All samples are analyzed by transmission electron microscopy using the counting method as described in the Asbestos Hazard Emergency Response Act (AHERA) (EPA 1987) with site-specific modifications

- NPE negative pressure enclosure
- a Minimum volume requirements according to the method are 25 L. However, in order to achieve a reasonable analytical sensitivity by TEM, the sampler should attempt to collect 400 L of air for the BZ sample.
 - b If any LA fibers are detected in perimeter monitoring, corrective measures must be taken immediately by modifying work practices and engineering controls
 - c As stated in the technical memorandum (EPA 2003b) efforts will be made to avoid having to repeat cleanup activities at a property by cleaning soils at the residential or commercial property to ND up to the maximum cleanup depth of 12 or 18 inches (yard soil/driveway or specific use areas, respectively). Excavation beyond the maximum cleanup depth will only continue if soils have concentrations 1% LA.
 - d If PCM results are above the OSHA PEL, TEM AHERA confirmation must be performed.
 - e Approximately 0.5 kg for analysis and 0.5 kilogram for archival

Step 4: Define the Study Boundaries

Define the target population, spatial and temporal boundaries, potential constraints, and the smallest subpopulation.

The target population, spatial and temporal boundaries, potential constraints, and the smallest subpopulation are summarized in Table 5-3.

Table 5-3 Study Boundaries

RA Monitoring	Personal Breathing Zone Air Monitoring	Ambient air within the workers' breathing zone; during removal activities (daily sampling required)	Each individual worker's breathing zone for the task performed (daily sampling required)	Collected during exterior or interior removal activities (i.e., removal, interior cleaning)	NA	1 air sample for each Level C task (e.g., laborer, bulk removal, operator, etc.) per week.
RA Monitoring	Perimeter Air Monitoring	Ambient air at the boundary of the EZ; during removal activities	Vertical: Air space above the exclusion zone to sampling height (~4-6 feet) Horizontal: perimeter bounding the site-specific EZ	Collected during exterior removal activities (i.e., excavation)	Inaccessibility due to property boundaries or other obstacles Inclement weather such as rain that can cause the sample to be void ©	4 air samples that bound the EZ

EZ Exclusion Zone
RA Removal Action
bgs below ground surface
NA not applicable

Step 5: Develop a Decision Rule

Population Parameter, Action Levels, Decision Rule:

The population parameter, action levels, and decision rules are summarized in Table 5-4.

Table 5-4 Decision Rule

Data Quality Objective	Sample Description	Population Parameter	Action Level	Decision Rule
RA Monitoring	Personal Breathing Zone Air Monitoring	1 air sample representing the breathing zone for the activity conducted	TWA: 0.1 PCME f/cc STEL: 1.0 f/cc	If the concentrations of the BZ samples 0.1 f/cc engineering controls, work practices, and/or PPE will be re-evaluated and/or work will stop. If no, cleanup activities will continue with no additional evaluation.
RA Monitoring	Perimeter Air Monitoring	4 air monitoring samples that bound the perimeter of the EZ	Each air sample <ASTEM Approx. <0.005 S/cm3	If the concentration of any of the 4 samples 0.005 S/cm3, then excavation engineering controls and work practices will be re-evaluated and/or work will be stopped. If all 4 perimeter air samples are ND, then no action will be taken.

EZ Exclusion Zone

RA Removal Action

PCME PCM Equivalent

TWA Time Weighted Average

a Action Level/Clearance Criteria Technical Memorandum (EPA 2003a).

Step 6: Specify Tolerable Limits on Decision Errors

Null Hypotheses, consequence of making an incorrect decision, gray region, tolerable limits:

For the purposes of completing all six steps of the DQO process, the null hypotheses and consequences of making an incorrect decision are summarized in Table 5-5. However, the gray region and tolerable limits on decision errors are not proposed because they are not applicable in this case.

Typically, Step 6 of the DQO process is useful to encourage careful design of decision rules by defining and integrating the errors that are acceptable based upon myriad integrated project management decisions such as reduction in risk to human health, implementability/practicability, and cost. As stated in the guidance document for development of DQOs: QA/G-4 (EPA 2000), solely statistically generated tolerable limits on decisions errors are not necessary in certain cases providing a line of reasoning (scientific justification) is presented that adequately defines acceptable limits or decision errors. This particular effort was put forth in the Action Level/Clearance Criteria Technical Memorandum for the following DQOs: (1) Soil Confirmation Samples, (2) Perimeter Monitoring Air Samples, and (3) Air Confirmation for Indoor Dust Removal. The decision rule for the personal (BZ) air monitoring samples has been promulgated by legislation, and as such, limits on decision errors do not apply.

Table 5-5 Limits on Decision Errors

Data Quality Objective	Sample Description	Null Hypothesis	Type 1 Error Will Result In:	Type 2 Error Will Result In:
RA Monitoring	Personal (BZ) Air Monitoring	The BZ air is contaminated with LA above the worker safety action levels.	Determining that the BZ air is not contaminated with LA above the worker safety action levels when it actually is. This in turn, results in an increased risk to workers performing removal actions.	Determining that the BZ air is contaminated with LA above the worker safety action levels when it is not. This in turn, results in re-evaluating engineering controls, possibly stopping work, or increasing the level of PPE when it is not necessary and adds unnecessarily to clean up costs.
RA Monitoring	Perimeter air monitoring	The perimeter air is contaminated with LA	Determining that the air is not contaminated with LA when it actually is. This in turn, results in an increased risk to human health.	Determining that the perimeter air is contaminated with LA when it is not. This in turn results in re-evaluating engineering controls and possibly stopping work when it is not necessary and adds unnecessarily to clean up costs.

Step 7: Optimize the Design for Obtaining Data

Using data previously generated for the site, the DQOs have been designed to support the proposed removal activities for the WP and represents the best possible project planning effort. However, in implementing the WP/SAP, unforeseen situations may arise or team members may find more efficient means to carry out some of the day-to-day activities. Therefore, team members are always afforded the opportunity to recommend optimization of the data gathering design. Recommendations must come through proper channels as described in Section 5.1 and documented using either a modification form or an addendum to the WP. All modifications or addenda must be approved prior to making the proposed changes.

5.2.2 Data Measurement Objectives

Every reasonable attempt will be made to obtain a complete set of usable field measurements and analytical data. If a result cannot be obtained or is rejected for any reason, the effect of the missing data will be evaluated and transmitted to EPA. In addition, the Surface Soil Sampling SOP provides guidance to ensure that the samples obtained are representative of the media at the Site.

5.2.2.1 Quality Assurance Guidance

The field QA program has been designed in accordance with EPA's Guidance for the DQO Process (EPA 2000), and the EPA Requirements for Quality Assurance Project Plans for Environmental Data Operations (EPA 2001).

5.2.2.3 Laboratory Analysis

Samples collected under this Appendix will be analyzed for parameters listed below using methods in parentheses. The analytical methods are as follows:

Personal air samples - PCM (NIOSH 7400 Issue 2)

Stationary air samples - TEM AHERA (40CFR Part 763 Subpart E)

Samples will be submitted to contract laboratories. Prior to shipping samples, sampling personnel will ensure that the laboratories are ready to receive and analyze samples, can provide necessary data packages, and can provide an electronic copy of the data. The laboratories will submit analytical data reports to the HSM. The data reports will contain a case narrative that briefly describes the number of samples, the analyses, and any noteworthy analytical difficulties or QA/QC issues associated with the submitted samples. The data report will also include signed COC forms, cooler receipt forms, analytical data, and a QC package. The laboratories will provide an electronic copy of the data to the HSM.

Laboratory Quality Assurance Program

The laboratories must be NVLAP (National Voluntary Laboratory Accreditation Program) certified and must follow the NVLAP QA program requirements. In addition, the laboratories performing analyses must follow all project-specific analytical and QA/QC modifications and must continue to participate in the project-specific analysis of performance evaluation samples, inter-laboratory samples, same and different analyst recounts, verified analyses, and laboratory duplicates at the project-specified frequencies.

5.3 Special Training Requirements

Special training required for this project includes the following:

- Health and safety training, as described in the SHASP

5.4 Documentation and Records

The HSM has the responsibility for maintenance of records, including copies of all FSDSs, original field logbooks, work plans and SAPs, and any correspondence pertinent to conducting removal activities at the site. Original FSDSs are maintained in the on-site office in the event that sample information needs to be

updated or corrected. Revisions to FSDSs will be made using a single strikeout, initial, and date. Because field logbooks are not to be revised, original logbooks are shipped offsite to a secure file repository and copies maintained for reference on-site. These are shipped by the QA representative. Property surveys, if required, are maintained in the secure file repository. Project personnel are responsible for project documents in their possession while working on a particular task. Field logbook(s) are issued on an as-needed basis. A logbook is maintained in the on-site office and provided by the HSM. Documentation describing changes to approved field plans or sample preparation or analytical methods, if they occur, will be included in the project files in the form of an approved Request for Modification form.

Section 6

Measurement and Data Acquisition

This section covers sample process design, sampling methods requirements, handling and custody, analytical methods, QC, equipment maintenance, supply acceptance, and data management. The field procedures are designed so that the following occurs:

- Samples collected are consistent with project objectives
- Samples are collected in a manner so that data represent actual site conditions

6.1 Sample Process Design

The overall goal of the sampling is to monitor: (1) worker exposure and contaminant containment during removal activities. This will be accomplished by collecting personal air (BZ) samples and stationary monitoring samples during removal. The sample process design is discussed in Section 3 of this SAP.

6.2 Sampling Methods Requirements

Sampling methods, sample containers, and overall field management are described below.

6.2.1 Sampling Equipment and Preparation

Equipment required for field sampling, health and safety, documentation, and decontamination is presented in Sections 4.2 of this document. Field preparatory activities include review of this SAP and SOPs, procurement of field equipment, laboratory coordination, and a daily field planning meeting that includes field personnel, the HSM, and the QAM. Mobilization is described in Section 4 of this document.

6.2.2 Sample Containers

All confirmation air samples will be collected and placed into plastic zip-lock baggies.

6.2.3 Sample Collection, Handling, and Shipment

Samples collected during the project consist of air and QC samples. All sample collection procedures are outlined in Section 4 of this document. QC samples will also be collected, handled, and shipped in accordance with these procedures.

6.3 Sample Handling and Custody Requirements

Custody and documentation for field and laboratory work are described below, including a discussion of corrections to documentation.

6.3.1 Field Sample Custody and Documentation

Sample custody and documentation will follow all applicable laboratory requirements including the utilization of COC forms. All samples and sampling paperwork will be relinquished to the HSM at the end

of each day. The HSM will be responsible for managing all field forms. The distribution of field paperwork is discussed in Section 5.6. Upon completion of the FSDS by the sampler and a possible quality control spot check by an independent field team member, the HSM will use the FSDS to generate a COC. Three copies of the COC will then be printed using three-part carbonless paper. One copy will be filed in the on-site office and the other two will accompany sample shipments. The HSM will check the COC against the samples in the shipping container to ensure consistency and will hand deliver or ship samples as appropriate. If any errors are found on the COC after delivery/shipment, the paper copy of the COC maintained in the on-site office will be corrected by the HSM with a single strikeout, initial, and date. The corrected copy will then be faxed to the analytical.

6.3.1.1 Sample Labeling and Identification

A unique alphanumeric code, or Index Identification (ID), will identify each sample collected during sampling events. The coding system will provide a tracking record to allow retrieval of information about a particular sample and to ensure that each sample is uniquely identified. Index IDs will be sequential and not be representative of any particular building or equipment. Index IDs will correlate with sample locations IDs, which will be identified on field sample data sheets (FSDSs) and in the field logbooks. The sample labeling will follow the scheme outlined below:

2R-XXXXX

Where:

2R identifies that a sample is collected in accordance with this SAP
XXXXX represents a 5-digit numeric code

Pre-printed adhesive Index ID labels will be prepared by the HSM or his designee using an Index ID logbook. The labels are controlled to prevent duplication in assigning sample IDs. The labels will be affixed to both the sample cassette and sample bag for air samples, and both the inner and outer sample bags for soil samples.

6.3.1.2 Chain-of-Custody Requirements

Chain-of-custody procedures and sample shipment will follow the requirements outlined by the laboratory including the packaging and shipping of samples. The COC record is employed as physical evidence of sample custody and control. This record system provides the means to identify, track, and monitor each individual sample from the point of collection through final data reporting. A completed COC record is required to accompany each shipment of samples. All samples will be handled under the supervision of the HSM under strict custody. The HSM will follow custody procedures to ensure proper sample custody between acceptance of samples from the samplers and shipment to the laboratory.

6.3.1.3 Sample Packaging and Shipping

Samples will be packaged and shipped in accordance with the requirements outlined by the laboratory including the packaging and shipping of samples. All samples will be picked up by a courier, delivered to the laboratories, or shipped by a delivery service to the designated laboratories, as necessary.

6.4 Analytical Methods Requirements

The laboratory QA program and analytical methods are addressed below.

6.4.1 Laboratory Quality Assurance Program

Samples collected during this project will be analyzed in accordance with standard EPA and/or nationally recognized analytical procedures. The analytical laboratories must be NVLAP (National Voluntary Laboratory Accreditation Program) certified and must follow the NVLAP QA program requirements. In addition, the laboratories performing analyses must follow all project-specific analytical and QA/QC

modifications and must continue to participate in the project-specific analysis of performance evaluation samples, inter-laboratory samples, same and different analyst recounts, verified analyses, and laboratory duplicates at the project-specified frequencies.

6.4.2 Methods

The methods to be used for analysis are described in Section 5.4.2.4. The following asbestos analytical methods are to be used:

- PCM (NIOSH 7400 Issue 2), for personal breathing zone air sample analysis
- TEM AHERA (40CFR Part 763 Subpart E) with modification, for stationary and final clearance air sample analysis, and positive identification of asbestos fibers as a supplement to NIOSH 7400

6.5 Quality Control Requirements

Field and internal office QC are discussed below.

6.5.1 Field Quality Control Samples

Field QC samples will consist of lot and field blanks for air sampling. The frequency of collection and analysis requested for lot and field blanks are discussed in detail in Section 3.2, Quality Assurance and Quality Control Samples. No other field quality control samples are required to be collected under this SAP.

6.5.2 Internal Quality Control Checks

Internal QC checks will be conducted throughout the project to evaluate the performance of the project team during data generation. All internal QC will be conducted in accordance with the applicable procedures listed below:

- All project deliverables will receive technical and QA reviews prior to being issued to EPA in any form.
- Completed review forms will be maintained in the project files.
- Corrective action of any deficiencies is the responsibility of the PM, with assistance from the QAM, if necessary.

6.5.3 Quality Control Checks

Internal QC checks will be conducted throughout the project to evaluate the performance of the project team during data generation. All internal QC checks will be conducted in accordance with the applicable procedures listed below:

- All project deliverables will receive technical and QA reviews prior to being issued to EPA in any form
- Completed QC Control review forms, which document technical and QA reviews of project deliverables, will be maintained in the project files.
- Field and office audits will each be performed, if requested by the PM.
- Field and office assessments may be performed as spot checks, at a frequency determined by the QAM.
- Corrective action of any deficiencies is the responsibility of the PM, with assistance from the QA staff, if necessary.

In addition to internal QC checks, PacifiCorp or EPA may, at any time, perform independent audits or assessments of work practices, including field, office, or laboratory checks.

6.6 Equipment Maintenance Procedures

All field and laboratory equipment will be maintained in accordance with the manufacturers' maintenance and operating procedures. All maintenance activities will be documented in a logbook. For the field

activities, a description of maintenance performed will appear in the field logbook on the date/time that it occurred. See Section 6.7.2 for details on record keeping for maintenance at the analytical laboratories.

6.7 Instrument Calibration Procedures and Frequency

Calibration of field and laboratory instruments is addressed in the following subsections.

6.7.1 Field Instruments

The only field measurements collected during this project are volume estimations. Since these do not require field instruments, no calibration or maintenance is required.

6.7.2 Laboratory Instruments

Calibration of laboratory instruments will be based on written procedures approved by laboratory management and included in the laboratory's QA manual. Instruments and equipment will be initially calibrated and continuously calibrated at required intervals as specified by either the manufacturer or more updated requirements (e.g., methodology requirements). Calibration standards used as reference standards will be traceable to EPA, National Institute of Standards and Technology, or another nationally recognized reference standard source. Records of initial calibration, continuing calibration, repair, and/or replacement of laboratory equipment will be filed and maintained by the laboratories. Calibration records will be filed and maintained at the laboratories' location where the work is performed and may be required to be included in data reporting packages.

6.8 Acceptance Requirements for Supplies

Prior to acceptance, all supplies and consumables will be inspected by the HSM or designee to ensure that they are in satisfactory condition and free of defects.

6.9 Non-direct Measurement Data Acquisition Requirements

Non-direct measurement data include information from previous sampling events. The acceptance criteria for such data include a review by someone other than the author. Any measurement data included in information from the above sources (i.e., previous sampling event) will determine further action at the Site only to the extent that those data can be verified by project staff.

6.10 Data Management

The laboratories will submit hard copy sample data packages to the HSM, and electronic data deliverables (EDDs) to PacifiCorp.

Section 7 Assessment and Oversight

Assessments and oversight reports to management are necessary to ensure that procedures are followed as required and that deviations from procedures are documented. These reports also serve to keep management current on field activities.

Assessment and oversight reports are discussed below.

7.1 Assessments and Response Actions

Assessments and corresponding response actions are discussed below.

7.1.1 Assessments

Performance assessments are quantitative checks on the quality of a measurement system and are appropriate to analytical work. Performance assessments for the laboratories may be accomplished by submitting reference material as blind reference (or performance evaluation) samples. These assessment samples are samples with known concentrations that are submitted to the laboratories without informing the laboratories of the known concentration. Samples will be provided to the laboratories for performance assessment upon request from the EPA OSC or PacifiCorp PM. Laboratory audits may also be conducted upon request from the EPA OSC or PacifiCorp PM.

System assessments are qualitative reviews of different aspects of project work to check on the use of appropriate QC measures and the functioning of the QA system. Any determination or changes for project assessments will be performed under the direction of the QA manager, who reports directly to the PM.

7.1.2 Response Actions

Response actions will be implemented on a case-by-case basis to correct quality problems. Minor response actions taken in the field to immediately correct a quality problem will be documented in the applicable field logbook and a verbal report will be provided to the HSM. For verbal reports, the HSM will complete a communication log to document that response actions were relayed to him. Major response actions taken in the field will be approved by the HSM and the EPA OSC and PacifiCorp PM prior to implementation of the change. Major response actions are those that may affect the quality or objective of the project. All formal response actions will be submitted to either the HSM or the QAM for review and issuance.

EPA and/or UDEQ have the authority to inform PacifiCorp or the site HSM regarding unsafe conditions or releases of hazardous substances and to require that immediate corrective action be taken and/or work stopped at the project.

7.2 Reports to Management

QA reports will be provided to the HSM and PM whenever quality problems are encountered. Quality problems will be noted on field data sheets. The HSM will inform the project QAM upon encountering quality issues that cannot be immediately corrected. Weekly reports and change request forms are not required for this work assignment. Weekly QA reports will be submitted to the EPA and UDEQ via e-mail.

Topics to be summarized regularly may include but not be limited to:

- Document technical and QA reviews that have been conducted
- Activities and general program status
- Project meetings
- Corrective action activities
- Any unresolved problem
- Any significant QA/QC problems not included above

Section 8

Data Validation and Usability

Laboratory results will be reviewed for compliance with project objectives. Data validation and evaluation are discussed in Sections 8.1.

8.1 Reconciliation with Data Quality Objectives

Once data has been generated, the HSM evaluates data to determine if DQOs were achieved. This achievement will be discussed in the measurement report, including the data and any deviations to this

SAP. Additionally, a section in the measurement report will present the data quality assessment (DQA) evaluation. The DQA will synthesize the data reviews described in Section 8.1 and provide information about any overall biases introduced into the data due to either field or analytical activities. All QC sample results will be maintained in the same database along with the investigative sample results.

Appendix D

Site Health and Safety Program (SHASP)

3rd West Substation
"2011 Upgrade Project"



Prepared for:

Brian King
Rocky Mountain Power
1407 West North Temple
Salt Lake City, Utah 84116
brian.king@pacificorp.com
(801) 220-4831

Prepared by:

R & R Environmental, Inc. (R & R)
David C. Roskelley, MSPH, CIH, CSP
47 West 9000 South, Suite #2
Sandy, Utah 84070
dave@rrenviro.com
(801) 541-1035



ENVIRONMENTAL, INC.
ASBESTOS • LEAD • INDUSTRIAL HYGIENE

May 2011

Site Health and Safety Program

3rd West Substation Upgrade Project

Prepared for:

PacifiCorp

Brian King
Rocky Mountain Power
1407 West North Temple
Salt Lake City, Utah 84116
brian.king@pacificorp.com
(801) 220-4831

Prepared by:

David C. Roskelley, MSPH, CIH, CSP
R & R Environmental, Inc. (R & R)
47 West 9000 South, Suite #2
Sandy, Utah 84070
dave@rrenviro.com
(801) 541-1035

May 2011

Contents

Acknowledgement and Signature Page

1.0	INTRODUCTION	
1.1	Purpose of Site Health and Safety Program	1-1
1.2	Responsibilities of Health and Safety Program	1-1
1.3	Revision of the Health and Safety Program	1-2
1.4	Implementation of the Health and Safety Program	1-2
2.0	HEALTH AND SAFETY PROJECT ORGANIZATION	
2.1	Organization and Safety Responsibilities	2-1
2.2	Responsible Persons	2-1
2.2.1	Project Manager	2-1
2.2.2	Health and Safety Manager	2-2
2.2.3	Subcontractors	2-3
2.2.4	Authorized Site Visitors	2-3
3.0	HAZARD ASSESSMENT	3-1
4.0	GENERAL HEALTH AND SAFETY PROGRAM	
4.1	Project Management	4-1
4.1.1	Planning	4-1
4.1.2	Effective Project Coordination	4-2
4.1.3	Management Emphasis on Safety	4-2
4.1.4	Communication	4-2
4.1.5	Safe Work Environment	4-3
4.1.6	Safety Audits/ Inspections	4-3
4.1.7	Correcting Unsafe Conditions	4-3
4.2	Standard Site Procedures	4-3
4.2.1	Housekeeping	4-4
4.2.2	Personal Protective Equipment	4-4
4.2.3	Excavation	4-4
4.3	Accident Reporting and Investigation	4-5
4.3.1	Follow Up	4-5
5.0	TRAINING	
5.1	Introduction	5-1
5.2	Initial Training	5-1
5.3	Refresher Training	5-1
5.4	Supervisory Training	5-2
5.5	Site Orientation	5-2
5.6	Toolbox Safety Meetings	5-2
5.7	Subcontractor Training	5-2
5.8	Record Keeping	5-3
5.9	Hazard Communication	5-3
5.9.1	Material Safety Data Sheets	5-3
5.9.2	Labels	5-4
5.9.3	Non-routine Tasks	5-4
5.9.4	Education and Training	5-4
5.9.5	Informing Other Employees	5-5
6.0	RESPIRATORY PROTECTION	
6.1	Definitions	6-1

6.2	General Requirements	6-2
6.3	Medical Surveillance.....	6-2
6.4	Selection of Respiratory Protective Devices	6-3
6.5	Training	6-5
6.6	Fit Testing and Field Checks	6-6
6.7	Inspection.....	6-6
6.8	Use, Maintenance, and Care	6-6
6.9	Breathing Air	6-7

Acronyms

AHERA	Asbestos Hazard Emergency Response Act
ASTM	American Society for Testing and Materials
CFR	Code of Federal Regulations
cm ²	square centimeter
COTR	Contracting Officer Technical Representative
EMSL	EMSL Analytical Inc.
EPA	U. S. Environmental Protection Agency
ERT	EPA Emergency Response Team
f/cc	fibers per cubic centimeter
GLP	good laboratory practices
GPS	global positioning system
HSM	Health and Safety Manager
ISO	International Standards Organization
kV	kilovolt
L	liter
MFL	million fibers per liter
MSDS	Material Safety Data Sheet
nm	nanometer
NIOSH	National Institute of Occupational Safety and Health
OSC	On-Scene Coordinator
OSHA	Occupational Safety and Health Administration
OU	Operable Unit
PCM	phase contrast microscopy
PLM	polarized light microscopy
QC	quality control
R & R	R & R Environmental, Inc.
S/mm ²	structures per square millimeter
SHASP	Site Health and Safety Plan
SOP	Standard Operating Procedure
SQAPP	Sampling and Quality Assurance Project Plan
TEM	transmission electron microscopy
TLV	threshold limit value
°C	degrees Celsius
°F	degrees Fahrenheit

Section 1

Introduction

This Site Health and Safety Program (SHASP) was prepared by R & R Environmental, Inc. (R & R) for the PacifiCorp 3rd West Substation Upgrade Project, Salt Lake City, Utah. This plan is based on all available site-specific data. In addition to other regulatory requirements, all work will be performed in compliance with applicable parts of regulations set forth by the U. S. Occupational Safety and Health Administration's (OSHA) Title 29 of the Code of Federal Regulations (CFR), Parts 1910 and 1926; and EPA's Hazardous Waste Requirements (40 CFR 260-270). The contents of this SHASP are subject to review and revisions as new information becomes available.

1.1 Purpose of the Site Health and Safety Program

The purpose of this SHASP is to describe the chemical and safety hazards that may be present, and the precautions to be taken to abate these hazards during the collection of various types of environmental samples, and removal activities at the 3rd West Substation site. Removal activities are defined to be the removal and disposal of *encountered* contamination during construction activities. The safety and health procedures outlined in this SHASP are designed to minimize the possibility of injury or asbestos exposure to site personnel during various sampling and removal activities.

This SHASP is intended as a guideline that allows the Health and Safety Manager (HSM) to respond to changing conditions regarding the interpretation of monitoring data and related control measures and is intended to provide additional guidance to the personnel conducting the work (construction contractor(s)).

1.2 Responsibilities of the Health and Safety Program

The requirements established by this SHASP are mandatory, and apply to all PacifiCorp personnel and PacifiCorp subcontractors involved in implementing the described scope of work, and any other personnel entering regulated work areas during active field operations. The Construction Contractor (Contractor) is responsible to be familiar with the content of the SHASP and train site personnel regarding this plan prior to the commencement of work. The HSM will be available to assist and ensure the Contractor adequately performs the training. A copy of this plan is available to any authorized personnel who must enter regulated work areas. PacifiCorp's Contractor will maintain a copy of the SHASP, available for inspection, at the work site during each day of field operations.

The Contractor will be responsible for implementation of this plan and will report directly to the PacifiCorp Project Manager and HSM on all project related health and safety matters. The HSM will evaluate Contractor activities to ensure this plan is followed and adequately implemented. The HSM will report to the PacifiCorp Project Manager on all project related health and safety matters. In the event that an emergency situation arises, the HSM will coordinate with the PacifiCorp Project Manager and the Contractor for immediate response. The HSM will notify the applicable EPA and state representatives as needed. The HSM has the authority to intercede directly and stop any unsafe practices.

1.3 Revision of the Health and Safety Program

Changes in the scope of work operations, and/or changing or unanticipated site conditions may require modification and approval of the SHASP in order to maintain field safety in compliance with contract requirements and OSHA regulations. Work operations affected by the revisions will not proceed unless specifically authorized by the HSM and PacifiCorp; and as needed through coordination with EPA's applicable representative.

1.4 Implementation of the Health and Safety Program

Before activities begin on or around the site the HSM will coordinate with the Contractor and assist with conducting an initial health and safety planning or "tailgate" meeting with site personnel to discuss safety procedures and to familiarize personnel with the potential hazards of the site. Site personnel will be informed of any modifications to the SHASP during daily tailgate safety meetings or when site conditions or risks change. The daily meetings will be facilitated by the Contractor and attended as needed by the HSM.

The HSM will also perform daily safety inspections throughout the project to evaluate site operations and assess the Contractor's implementation of appropriate measures.

Section 2

Health and Safety Project Organization

2.1 Organization and Safety Responsibilities

The PacifiCorp field work team will consist of the Project Manager (PM), Health and Safety Manager (HSM), and Contractor, sampling personnel, and equipment operators. This section presents discussions of the health and safety responsibilities of PacifiCorp personnel and their contractors, and authorized site visitors.

PacifiCorp has a definite line of reporting for individuals tasked with health and safety responsibilities. The health and safety responsibilities of the project team are outlined in the following sections.

2.2 Responsible Persons

2.2.1 Project Manager

The health and safety responsibilities of the Project Manager include, but are not limited to:

- Ensuring that the SHASP is approved by the EPA prior to commencement of operations
- Ensuring that all site personnel are informed of known and potential hazards associated with the work, the Work Plan, SHASP requirements, proper use of required personal protective equipment, specified safe work practice, proper action in the event of medical or chemical emergencies, and related site specific safety information
- Ensuring that required personal protective equipment, air monitoring instruments, and other safety-related items are provided for the project
- Monitoring overall safety performance of field personnel, in coordination with the HSM
- Correcting any work practices and/or conditions that may result in injury and/or exposure to hazards
- Immediately stopping the Work in the event of an emergency or serious hazard
- Preparing and submitting required work progress/accident history reports and air monitoring reports
- Warehousing all required safety and health records (i.e. OSHA 300 Logs, Accident Reports, Records of Training, Safety Inspection Reports, etc.) and submit to EPA's representative as needed

2.2.2 Health and Safety Manager

The health and safety responsibilities of the Health and Safety Manager (HSM) include, but are not limited to:

- Assist Contractor with daily on-site implementation and enforcement of the SHASP
- Being on-site for the duration of field activities for safety- and health-related duties
- Ensuring site compliance with federal, state and OSHA safety and health regulations and all requirements of the SHASP including, but not limited to, air monitoring, use of PPE, decontamination, site control, procedures used to minimize hazards, safe use of engineering controls, the emergency response plan, spill containment program, and documentation of the daily safety and health inspection results
- Evaluating air monitoring data and recommending changes to engineering controls, work practices, and PPE
- Assisting Contractor with and/or conducting any on-site safety and/or health training
- Stopping work if unacceptable health or safety conditions exist, and taking necessary action to re-establish and maintain safe working conditions
- Providing 24-hour availability for consultation during on-site emergencies
- Providing on-site consultation, as needed
- Consulting with and coordinating any modifications to the SHASP with PacifiCorp and Contractor as well as the EPA representatives as needed
- Assisting Contractor with quality control on matters relating to safety and health
- Conducting accident investigations and preparing accident reports in addition to Contractor as requested by PacifiCorp
- Documenting the safety and health findings during daily quality control inspections
- Recommending corrective actions for identified safety and health deficiencies and overseeing the corrective actions implemented by the Contractor, in coordination with PacifiCorp
- Performing collateral duties as the Site Quality Control Officer (QCO) on this project with the combined title of Site Health and Safety/Quality Control Officer (SSH/QCO). These duties shall include:
 - Assisting Contractor to ensure all personnel on-site are acquainted with appropriate provisions of SHASP
 - Inspecting safety and health equipment to assure proper operation and accuracy
 - Monitoring the PPE and safety practices
- Providing continued support for upgrading/downgrading of the level of personal protection

2.2.3 Contractor(s)

The health and safety responsibilities include the following:

- Contractors have the same responsibilities as PacifiCorp field personnel and are responsible with the implementation of required activities stated in the SHASP in addition to oversight activities
- Training all site personnel regarding known and potential hazards associated with the work, the Work Plan, SHASP requirements, proper use of required personal protective equipment, specified safe work practice, proper action in the event of medical or chemical emergencies, and related site specific safety information
- Monitoring safety of field personnel, including proper use of personal protective equipment
- Correcting any work practices and/or conditions that may result in injury and/or exposure to hazards
- Immediately stopping the Work in the event of an emergency or serious hazard
- Preparing and submitting any required work progress/accident history reports to PacifiCorp
- Maintaining all required safety and health records (i.e. OSHA 300 Logs, Accident Reports, Records of Training, Safety Inspection Reports, etc.) and submitting such reports to PacifiCorp
- Enforcing daily on-site implementation of the SHASP
- Provide Material Safety Data Sheets (MSDSs) for subcontractor-provided materials at the job site

2.2.4 Authorized Site Visitors

The health and safety responsibilities include:

- Receiving site hazard and safety instructions from the Contractor and HSM
- Reviewing and complying with the SHASP
- Using PPE to enter regulated work areas, when such controls are required for entry as per the SHASP
- Reporting any observed unsafe act and/or condition at, or affecting, the work site

In addition, any official visitor who seeks entry into work area will present current documentation of current AHERA/EPA 2-hour Asbestos Awareness training, site specific electrical hazard training, and Respirator Fit Testing. In addition, the Contractor shall maintain a visitor and training log onsite. The Contractor shall implement an appropriate form of identification (sticker, photographic identification badge, etc) which indicates appropriate training has been received. This will be visible at all times upon site personnel and authorized visitors.

Section 3

Hazard Assessment

Trace amounts of Libby amphibole are known to be present at the site. Hazards include asbestosis, a disease that makes breathing progressively more difficult due to scarring of the lung tissue and can be fatal. Libby amphibole fibers may also be a contributing cause to lung cancer and mesothelioma. Mesothelioma is a rare cancer of the lining of the lungs and chest cavity that is always fatal and can almost always be associated with asbestos exposures.

The primary concern is breathing airborne Libby amphibole fibers. All site personnel will be protected from Libby amphibole exposure through work practices. These work practices include wetting the soil during excavation, covering trucks during hauling, and considering wind direction during work activities. Personal protective equipment will be used by site personnel. Personal protective equipment will include the use of NIOSH-approved respirators with high-efficiency cartridges and Tyvek® disposable clothing, or FR clothing (as specified by PacifiCorp). All site personnel working in exclusion zones will complete personal decontamination on a daily basis.

The project includes excavation and transport of potentially contaminated soil. Additionally, dust and debris may be removed from enclosed structures that have been identified for removal or modification pending inspection for LA by a qualified consultant prior to ground disturbing activities. This consultant will be contracted by PacifiCorp. Safety hazards associated with general clean-up activities - slips, trips, falls, pinch points, collisions - present a more consistent and potentially greater risk than Libby amphibole exposure. Overall, the greatest individual site hazard will be general electrical hazards related to unintentional contact with high-voltage electrical conductors.

Section 4

General Health and Safety Program

4.1 Project Management

The most influential factor controlling project safety is effective project management, and the most influential personnel in this regard are the project managers (PacifiCorp and Contractor). Listed below in descending order are the five most important tools that project managers have to influence project safety:

- Effective project management
- Job coordination
- Management emphasis on safety
- Communication
- Safe work environment

Projects that run smoothly and are planned properly will show good safety performances. The opposite also holds true: jobs that run poorly (i.e., jobs behind schedule, under staffed, or poorly equipped) will ultimately show poor safety performances.

***Incorporating safety into initial project planning
enables site workers to perform tasks safely with
adequate staff, time, and equipment.***

4.1.1 Planning

Safety must be incorporated into the project from start to finish in order to maintain good safety performance. Incorporating safety into initial project planning enables site workers to perform tasks safely with adequate staff, time, and equipment. Up-front planning also allows for comprehensive hazard recognition and control planning by qualified staff. Activities such as confined space entry, emergency response, and site safety meetings must be recognized and coordinated early in the project planning stages.

When planning for safety, project managers should consider the following:

Costs. Costs should be considered for safety equipment such as decontamination equipment, air monitoring instruments, rescue equipment, protective clothing, and respirators.

Staff. Project managers should plan for adequate, qualified staff to perform the job safely. Staffing considerations may include rescue personnel, partners for the buddy system, and staff to perform air monitoring and prepare the health and safety plan (HASP).

Time. Time should be allotted for necessary safety activities, including site safety inspections, weekly Toolbox Safety Meetings, and site-specific health and safety plans (SHASPs) preparation and review.

4.1.2 Effective Project Coordination

Safety performance improves with improved project coordination. The following areas, when effectively coordinated by project managers, benefit project safety performance:

- Coordinating subcontractor activities
- Coordinating staff and crew size
- Coordinating with local hospital, rescue, and fire departments
- Public notices, public meetings, and site security
- Prompt waste disposal
- Equipment and material deliveries

4.1.3 Management Emphasis on Safety

Management emphasis on safety is a key component of site safety management. Project managers should wear appropriate safety equipment, maintain safety as a routine topic of planning and progress meetings, and recognize safe employees and discipline unsafe employees. Effective project managers send a clear and consistent message that safe behavior is expected and anything less will not be tolerated.

4.1.4 Communication

Possessing good "people skills" is often a significant factor in project safety because a good safety performance cannot be achieved without the project team communicating and working together. Project managers need to communicate safety expectations and instructions effectively. Site employees should understand the site safety procedures and be aware that compliance with them is required. They should feel comfortable to ask questions, report injuries, incidents, and safety concerns, and to provide general feedback and recommendations to the project manager.

Tailgate Safety Meetings offer not only the opportunity to provide technical safety instruction, but also provide occasion for feedback and suggestions from site employees. Personnel performing their craft can often suggest effective solutions to hazards, especially those pertinent to their trade. Overlapping hazards require effective communication and teamwork between the involved project staff.

4.1.5 Safe Work Environment

Project Managers and site personnel maintain a safe work environment by consistently implementing SHASP and adhering to OSHA standards and guidelines. Contractor or subcontractors may have safety plans in addition to this SHASP. If this is the case, it does not absolve them from adhering to this SHASP in addition to components of their safety plans that may not be included in this SHASP. The HSM should be consulted when tasks change and when unanticipated hazards arise to discuss safety issues and amend health and safety procedures accordingly.

The first step in controlling hazards is the recognition of the hazard. Employees share responsibility for observing the work areas and procedures to identify potential or existing hazards. Project Managers, Contractors and the HSM may perform inspections (audits) to identify and direct the correction of unsafe conditions and work practices.

4.1.6 Safety Audits/Inspections

Safety audits may be conducted to identify unsafe conditions and work practices on site. Safety audits are an effective tool in identifying unsafe conditions and work practices. The Contractor should perform safety audits on a weekly basis, or when new substances, processes, procedures, or equipment are introduced that pose a new occupational safety and health hazard and when new or unrecognized hazards are observed. The HSM will perform daily inspections and the project managers are encouraged to perform weekly inspections. The HSM will note and document any inspection findings identified as non-standard.

4.1.7 Correcting Unsafe Conditions

Unsafe conditions noted during safety audits or general observation must be assigned to a responsible person(s) for required follow-up action by the Contractor. The project manager(s) and HSM review safety audits to assure follow-up actions adequately control the hazard(s). Project managers and the HSM will not close a Site Safety Audit Report file until the required follow-up action is complete.

For situations presenting an imminent hazard to employees, the auditor directs work to cease and workers to exit the area immediately until the hazards are controlled. The HSM and project manager(s) have the authority to stop work until hazards are abated.

Hazards shall be controlled as quickly as possible and in a timely manner, based on the severity of the hazard as determined by the Contractor and/or PacifiCorp Project Manager or the HSM.

4.2 Standard Site Procedures

Due to the diverse nature of activities performed, there are a number of regulations and standards that must be considered during the performance of activities. In addition, there are standard procedures that are applicable to activities performed at all hazardous, or potentially hazardous, waste sites. This section summarizes some of the key OSHA standards and procedures that may be applicable to various activities.

The following project health and safety program rules are adopted for the protection of all persons involved with activities on all projects. These rules apply to management, owner, and site personnel as well as visitors while on the job site. These rules are general in nature and are not to be considered all-inclusive, nor do they relieve contractors, subcontractors, or their employees from applicable occupational health and safety regulations promulgated by governmental authorities.

4.2.1 Housekeeping

Leads, hoses, and extension cords shall be hung up with a nonconductive material, off all floors, stairways, and walkways. Trash such as drinking cups, cans, and scraps from lunch are not to be thrown down, but disposed of properly in marked containers.

Available material, equipment, concrete forms, pipe, etc. are to be stacked orderly away from walkways, doors, stairways, and ladders.

Oil, grease, and other such liquid spills shall be cleaned up at the time of spill and are not to be left unattended.

Each person is responsible for housekeeping in his or her respective work areas.

Where such items as protruding rebar or anchor bolts create a tripping hazard, they shall be properly protected and conspicuously marked.

4.2.2 Personal Protective Equipment

Eye Protection — Safety glasses shall be worn at all times. Safety goggles shall be worn when possible eye hazards are present. Full-face shields shall be worn while grinding, chipping concrete, or when possible hazards are present.

Hard Hats — Hard hats shall be worn at all times in all areas on site, except when inside an enclosed vehicle.

Shoes — Steel-toe safety boots or shoes meeting the requirements of ANSI 241.1 are to worn at all times, except in enclosed vehicles.

Shirts and Pants — Shirts covering the full trunk and shoulders are required. Tanktops or midriff shirts are not allowed. Cut-off jeans or shorts will not be worn on the job site.

Hearing Protection — Hearing protection shall be worn when working in excessively noisy areas.

Respiratory Protection — Respiratory protection shall be worn when required.

Vehicle Safety — Seat belts shall be worn in all vehicles.

Disposable Coveralls — Required at all times in the exclusion zone. Street clothes are not to be worn under disposable coveralls.

4.2.3 Excavation

All excavations five feet deep or deeper, and excavations shallower than five feet in unstable soil shall be sloped, braced, or shored to prevent cave-ins.

All excavations four feet deep or deeper shall have a ladder for access into the excavation with no more than 25 feet of lateral travel in any direction.

All excavated and available material shall be retained two feet or more from the edge of the excavation.

All excavations shall be barricaded with the appropriate barrier tape and other protective devices as required.

When entering an excavation that may be considered a hazardous environment by site safety representatives, proper personal protective equipment must be worn.

Full compliance with 29 CFR 1926.650 through .652 is required.

4.3 Accident Reporting and Investigation

All accidents are to be verbally communicated to the office HSM or the project manager(s) as soon as medical services are secured. Accidents that require immediate medical care should be addressed by calling 911. Accidents not requiring immediate medical care can be addressed at LDS Hospital, 8 Avenue and C Street, Salt Lake City, Utah. Directions to the facility are outlined below. These individuals will verbally notify the HSM within eight hours of the accident.

147 S 300 W Salt Lake City, UT 84101-1207	Miles Per Section	Miles Driven
1. Start out going NORTH on S 300 W / JOHN STOCKTON DR / US-89 N toward W 100 S / JAPANTOWN ST.	Go 0.4 Mi	0.4 mi
2. Turn RIGHT onto W NORTH TEMPLE. W NORTH TEMPLE is 0.1 miles past W SOUTH TEMPLE	Go 0.6 Mi	1.0 mi
3. W NORTH TEMPLE becomes 2ND AVE.	Go 0.3 Mi	1.3 mi
4. Turn LEFT onto B ST. B ST is just past A ST	Go 0.5 Mi	1.8 mi
5. Turn RIGHT onto 8TH AVE. 8TH AVE is just past 7TH AVE	Go 0.08 Mi	1.9 mi
6. 8TH AVE & C ST. If you are on C ST and reach 9TH AVE you've gone a little too far		1.9 mi
LDS Hospital 8th Ave & C St, Salt Lake City, UT 84143 (801) 408-1100	1.9 mi	1.9 mi

Necessary medical services and employee care are to be secured prior to the initiation of reporting and investigation. The investigation is to be thorough and performed, at a minimum, by the injured employee's immediate supervisor. The results of the investigation are to be documented using the report form, to be signed by the investigator.

4.3.1 Follow Up

If the injury/illness resulted from the uncontrolled release of hazardous material, the HSM is to be notified immediately to determine if additional monitoring should be prescribed.

As soon as practical, following the initial medical treatment, the injured employee is to be scheduled into the clinic that administers the annual examinations for the injured employee's office. This is necessary to ensure that the employee receives quality medical treatment during any type or recovery period. This does not apply to a subcontractor employee.

Accident reporting procedures that are client-specific and applicable are also to be enacted at this time.

The HSM will follow up with the project manager to ensure that corrective action, if identified in the "Injury/Illness Report Form," has been implemented.

Section 5

Training

5.1 Introduction

Contractor is responsible for ensuring site personnel are adequately trained. Ensuring that employees have the appropriate skills to perform the tasks assigned to them safely is a key accident prevention tool. The three main goals of employee training are:

- Train employees to identify and evaluate hazards correctly
- Give employees the technical understanding of how to work in a safe manner
- Promote safety awareness so that employees develop the attitude to want to work in a safe manner

5.2 Initial Training

Employees are trained when initially assigned or new to the hazards and precautions applicable to their work; when transferred to a new job; and when processes, hazards, or controls change.

The contents of initial training may include:

- Full 40 hour training as outlined in "Hazardous Waste Operations and Emergency Response" standard (HAZWOPER), 29 CFR 1910.120
- Comprehensive training on hazards and precautions specific to the employee's work
- A discussion of employee rights and responsibilities under OSHA regulations
- An explanation of who to contact with questions or concerns
- A review of this Health and Safety Program
- 30-minute site specific electrical hazard safety training

5.3 Refresher Training

Longer-service employees typically require refresher training when:

- Safety rules and regulations change
- Organizational structure changes (e.g., training in whom to contact)
- New equipment or procedures are introduced
- Additional skills, such as first aid, are needed

5.4 Supervisory Training

In addition to the initial and refresher training requirements, those individuals who supervise individuals performing removal of encountered LA / asbestos containing material activities at the 3rd West Substation site are required to have additional training. Topics included in this training include: SHASP, Chemical and Physical Hazard Recognition, Spill Containment, Contingency Plans, Health Hazard Monitoring; i.e., subjects that help them perform activities in a safe and healthy fashion. Likewise, these individuals should be trained at the 40-hour AHERA/EPA Asbestos Contractor/Supervisor level and must be able to document current proof of refresher training.

5.5 Site Orientation

The Contractor will become familiar with the site and hazards through the planning and bidding process with PacifiCorp. A thorough site orientation meeting will be held to review the health and safety procedures required on site. The SHASP will be discussed, emergency procedures are reviewed, and site security is explained. All personnel assigned will have reviewed materials increasing their Libby amphibole hazard awareness. Subcontractor coordination is addressed, if applicable. The site orientation is documented with an Employee Meeting Record Form (Form B) and the SHASP signature page. The Contractor (with PacifiCorp and HSM involvement) will conduct Site orientation meetings for site personnel. Subsequent orientations are to be held as new site employees or subcontractors come on site.

5.6 Tailgate Safety Meetings

Site-specific discussions on work tasks and hazard control maintains employee safety awareness. Productive safety meetings include a review of actual field conditions and feedback and suggestions from employees. These site safety meetings are referred to as Tailgate Safety Meetings.

The Contractor holds Tailgate Safety Meetings on a routine basis. Tailgate Safety Meetings discuss specific work tasks, the hazards involved, and controls for those hazards. The first Tailgate Safety Meeting is the site orientation and SHASP review on the first day of the job.

Documentation of the meeting is recorded on the Employee Meeting Record (Form B), located in Appendix A. When only one or two employees of a given contractor are onsite, they may choose to attend the Tailgate Safety Meeting held by the subcontractor rather than hold their own. In this case, documentation of the personnel in attendance should be obtained and kept in the project files by the Contractor. Noting attendance in the log book alone is not acceptable.

5.7 Contractor Training

Contractors are solely responsible for ensuring appropriate training for their employees, agents, and lower tier subcontractor employees.

Depending on site operations, joint subcontractor Tailgate Safety Meetings may be appropriate. These joint meetings offer the opportunity to coordinate and improve common site safety procedures, such as emergency evacuation and decontamination. Joint Tailgate Safety Meetings

are held by the Contractor with subcontractors in attendance and with the HSM present to participate.

In addition to the joint Tailgate Safety Meeting, the Contractor or subcontractor still must hold their own specific safety meetings in their area of expertise. The joint Tailgate Safety Meeting is in addition to the subcontractors' own safety meetings and does not serve to replace them.

5.8 Record Keeping

Records of site-specific training and any safety meetings are maintained by the Contractor on the Employee Meeting Record (Form B), and copies are submitted to the HSM and PacifiCorp on a weekly basis.

Originals of all project-generated forms, including health and safety forms, are kept with the other project records in the project file. Documentation of training is maintained for a minimum of three years and stored by PacifiCorp.

5.9 Hazard Communication

Employees have the right to know about the hazards of materials they work with. The right to know program implements the requirements of OSHA's Hazard Communication Standard (29 CFR 1910.1200). OSHA Standard 29 CFR 1910.1200 "Hazard Communication Standard" requires that all employees handling or using materials which may be hazardous, be advised and informed as to the hazard potential associated with those materials. The following sections outline the program designed for compliance with the scope and intent of the standard. The main elements of this program include a health and biological surveillance program, employee education and training program, and employee exposure determination program. It is only through the proper implementation and maintenance of such programs that maximum employee health and safety protection can be assured.

The Contractor has overall responsibility for Hazard Communication to site personnel. The HSM will be responsible to ensure that programs have been implemented by the Contractor.

5.9.1 Material Safety Data Sheets

A Material Safety Data Sheet (MSDS) is an information sheet that provides specific identification information about a chemical or material. The MSDS information may include:

- Ingredients and hazards
- Physical data
- Fire and explosion information
- Reactivity data
- Health hazard information
- Spill risk and disposal procedures

- Special protection information
- Special precautions required for use

It is the manufacturer's responsibility to provide this information for any materials containing hazardous or potentially hazardous ingredients.

A comprehensive collection of MSDSs exists. Prior to any project startup, it is the Contractor shall ensure that MSDSs are available for any material expected to be utilized or encountered during project work which represents a potential health and safety hazard to contractor employees through possible exposure. MSDSs should be secured from the manufacturer and/or project owner.

Copies of all MSDSs for materials expected to be utilized or encountered during project work are to be available at each project site, and each employee is to be made aware that these exist and are available.

5.9.2 Labels

It is the responsibility of the Contractor to ensure that all potentially hazardous materials brought to a project site are labeled as to the contents of each container and the appropriate usage of hazard warnings. The HSM will review such work.

5.9.3 Non-Routine Tasks

When employees are required to perform hazardous nonroutine tasks (i.e., confined space entry, line breaking, tank cleaning, etc.), the Contractor shall conduct a special training session will be conducted to inform those employees as to the hazardous materials to which they may be exposed and the proper procedures and personal protective equipment to be utilized to minimize exposure potential. The HSM will be available to assist.

5.9.4 Education and Training

Prior to any field project startup, the Contractor will conduct a pre-project training session with all employees expected to be involved with project work. the HSM will be available to assist. Included in this training session are the following:

- An overview of the hazard communication requirement
- A review of the chemicals present and anticipated to be encountered during the course of the project
- Identification of the location and availability of the written hazard communication program, the inventory of chemicals expected to be utilized and/or encountered, and the MSDSs for those materials
- Discussion of the methods and observation techniques that may be used to detect the presence of a release of hazardous chemicals in the work area

- Discussion of how to lessen or prevent exposure to hazardous workplace chemicals
- Instruction in emergency procedures to follow if employees are exposed to hazardous chemicals
- An explanation of the hazard communication program, including how to read labels and MSDSs to obtain appropriate hazard information
- An explanation of the proper use of personal protective equipment

5.9.5 Informing Other Employees

The Contractor will ensure that their employees and employees of subcontractors, have been provided access to information on the hazardous chemicals at a project site. It is the responsibility of the Contractor to ensure that the following information has been provided (the HSM will be available to assist):

- Where the MSDSs are located
- The name and location of the hazardous chemicals to which employees may be exposed and the appropriate protective measures
- An explanation of the labeling system

Section 6

Respiratory Protection

Following are information and guidelines necessary for the proper selection, use, and maintenance of respiratory protective devices. These guidelines are applicable to all employees performing duties requiring the use of respiratory protection and are designed to comply with 29 CFR 1910.134.

6.1 Definitions

Approved - Tested and listed as satisfactory by the National Institute for Occupational Safety and Health (NIOSH).

Contaminant - A harmful, irritating, or nuisance material in concentrations exceeding those normally found in the ambient air.

Disinfection - The destruction of pathogenic organisms, especially by means of chemical substances.

Immediately Dangerous to Life or Health (IDLH) - An atmospheric concentration of any toxic, corrosive, or asphyxiant substance that poses an immediate threat to life, would cause irreversible or delayed adverse health effects, or would interfere with an individual's ability to escape from a dangerous atmosphere.

Oxygen-Deficient Atmosphere - An atmosphere containing 19.5 percent or less of oxygen by volume.

Particulate Matter - A suspension of fine solid or liquid particles or fibers in air such as dust, fog, fume, mist, smoke, or sprays.

Pneumoconiosis-Producing Dust - Dust which when inhaled, deposited, and retained in the lungs may produce signs and symptoms of pulmonary disease.

Respirator - An approved device designed to provide the wearer with respiratory protection against inhalation of a contaminated atmosphere and, for some devices, oxygen-deficient atmospheres.

Vapor - The gaseous state of a substance that is solid or liquid at ordinary temperature and pressure.

Dusts - Solid particles, mechanically produced, with a size ranging from submicroscopic to macroscopic.

Fumes - Solid particles generated by condensation from the gaseous state, generally after volatilization from molten metals, with a size usually less than one micrometer in diameter.

Mists - Suspended liquid droplets generated by condensation or by breaking up of a liquid with a size ranging from submicroscopic to macroscopic.

Gases - Substances that are gaseous at ordinary temperature and pressures.

6.2 General Requirements

Respirators will be considered an acceptable method of protecting the health of personnel only under the following circumstances:

When it has been determined that there are no feasible engineering or work practice controls that can be used to adequately control the hazard.

During intermittent, non-routine operations (one hour/day for one day/week).

During interim periods when engineering controls are being designed and/or installed.

During emergencies.

As part of a safety procedure where a possibility for an excessive or potentially hazardous condition has been defined.

Air purifying respirators may only be worn in atmospheres that contain at least 19.5 percent and not more than 23.5 percent oxygen.

The multiplicity of hazards that may exist in a given operation requires a careful and intelligent respirator selection. The selection is made complex by the many types of respirators available. Each type has its special limitations, application, operational and maintenance requirements. For these reasons it is important that the individual responsible for the respiratory program be trained and knowledgeable in the basic principles of respiratory selection and use.

The standards governing the development of this program include but are not limited to the following:

American National Standard Institute (ANSI): Practices for Respiratory Protection, Z88.2-1992

OSHA: Respiratory Protection, 29 CFR 1910.134 and 29 CFR 1926.103

6.3 Medical Surveillance

Employees will not be assigned to tasks requiring the use of respiratory protection unless they have been determined to be physically able to wear such equipment. Contractor shall be responsible for fit testing and determining whether employees are physically able to wear a respirator.

6.4 Selection of Respiratory Protective Devices

Selection of respiratory protective devices for projects that require the use of such personal protective equipment is performed during the generation of SHASPs and/or AHAs as

described in Section 5. Information contained in Table 6-1, "Protection Factors," is used in the selection process.

When selecting the correct respiratory protective devices, there are several factors that must be considered, including:

Nature of the Hazard. Before selecting a respirator, the nature of the inhalation hazard must be identified. Oxygen deficiencies, physical hazards, chemical properties, movement and work rate limitations, and actual chemical concentrations and warning properties are all factors that must be considered.

Nature of Operation. The details of the actual operation and/or process that is creating the hazard is important in selecting appropriate respiratory protection.

Respirator Capabilities and Limitations. There are limitations associated with each type of respiratory protection devices. These limitations are discussed in Table 6-2.

The Contractor is responsible for the correct selection of respiratory protective devices. The HSM will be available to assist. Generally speaking, when Level C personal protective equipment is required, it will consist of at least a half-face respirator with P-100 cartridges. When supplied air respirators are required, they will be equipped with emergency escape bottles.

The descriptions and limitations of respiratory protection devices included in Table 6-2 are extracted from 30 CFR 11.

Table 6-1
Respiratory Protection Factors*

<i>Respirator</i>	<i>Protection Factor</i>
1. Particulate Filter Respirators	
- Powered air-purifying respirator with high-efficiency particulate filter (full-face).	1,000
- High-efficiency particulate filter respirator with a full facepiece.	100
- High-efficiency particulate filter respirator with a half facepiece.	10

* Adapted from ANSI Z88.2

Definition: Ratio of contaminant concentration outside respirator to inside.

Use: Allows calculation of maximum use concentration in which a particular type of respirator will provide adequate protection to wearer [i.e., (PEL) x (P.F.) = maximum use concentration].

Table 6-2
Respiratory Protection Devices

General Description	Limitations	Requirements
Air Purifying Respirators		
Half-mask or full facepiece respirator equipped with air purifying units to remove gases, vapor, and particulate matter from the ambient air prior to its inhalation. Some air purifying respirators are power-operated and provide respirable air to the facepiece (or hood) under a slight positive pressure.	Do not protect against oxygen deficient (<19.5%) atmospheres or atmospheres that are immediately dangerous to life and health (IDLH). The method of purification is generally chemical or chemical group specific so they cannot be used in atmospheres that contain unknown concentrations of unknown materials. Also cannot be used in atmospheres containing chemicals that present a health risk below their odor or taste thresholds. The useful life of this type of respirator is limited to the concentrations of contaminants, the breathing demand of the wearer, and the removal capacity of the purification medium.	When Level C respiratory protection devices are specified, they will consist of a full-face respirator with an MSA GMC-H (NIOSH approval number TC-23C-1283) cartridge or equivalent. Alternative respirators and cartridges must be approved by the HSM.
Atmosphere-Supplying Respirators		
A respirable atmosphere is supplied independent of the ambient air surrounding the wearer. These devices provide protection against oxygen deficiency and most toxic atmospheres.	Some limitations of atmosphere supplying respirators include time limitations of supplied air, bulkiness of equipment, and inherent safety hazards associated with working while dragging an airline or while wearing an air cylinder.	SCBAs will be pressure-demand types of devices, and where appropriate, equipped with an emergency escape bottle.

6.5 Training

Respirators will not be issued to employees who have not been adequately trained in their use. Contractor is responsible for ensuring necessary training. At a minimum, all employees and supervisory personnel who may be required to wear respiratory protective devices will receive training in the following:

- Problems associated with improper respirator usage.
- The nature of hazards associated with airborne contaminants.
- The capabilities and limitations of respirator types.
- The proper care, use, and maintenance of respirators.
- The performance of positive and negative field fit checks each time respiratory protection is donned. This includes the importance of the facepiece-to-face seal and of not using respirators when a good seal is not achievable.
- The fact that parts from different respirators are not interchangeable.
- How to properly inspect respiratory protective devices prior to use.
- Successful completion of a fit test for the specific respirator that is to be used.
- Documentation of training is completed for each individual and maintained in the training tracking system. An example of the respirator training form documentation appears as Form H.

6.6 Fit Testing and Field Checks

Fit testing will be performed on all employees assigned to project work that may require the use of respiratory protective devices. The Contractor is responsible for ensuring proper fit testing. Testing will be performed by a qualified individual in accordance with accepted fit test procedures. Documentation of fit testing is completed for each tested employee and maintained onsite by the Contractor. Positive and negative pressure field checks shall be performed immediately prior to use.

6.7 Inspection

All respirators shall be inspected before and after use. Respirators stored for emergency use only are inspected monthly. The Contractor is responsible for adequate inspection. Inspections generally cover the following:

- Condition of facepiece, connecting tubes, cartridges, and straps.
- Condition of the lens. Lenses should be free of scratches and seated tightly in retainers.

- Flexibility of all rubber parts. Deteriorated pieces should be replaced.
- Condition of all valves. Exhalation and inhalation valves are to be checked to ensure correct seating.
- On self-contained breathing apparatus (SCBA), air cylinder charges, regulators, and warning devices are to be inspected prior to use by individuals trained to perform these inspections. For units stored for emergency use, these inspections are to occur at least monthly.

6.8 Use, Maintenance, and Care

Employees are not assigned to tasks requiring the use of respiratory protection unless they have been determined to be physically able to wear such equipment, have been trained, and have completed a successful fit test by the Contractor.

Employees requiring the use of respirators must be clean shaven. Additionally, anything that interferes with the facepiece-to-face seal (i.e., glasses, long hair, skull caps, etc.) will not be permitted when respirators are required.

All respirators and cartridges are to be NIOSH/MSHA approved.

Only approved replacement parts will be used in respirator repair. Maintenance on self-contained breathing apparatus will only be performed by individuals certified by the manufacturer.

Respirators assigned to and worn by one individual will be cleaned and sanitized after each use. Extreme care is to be taken during the cleaning process to prevent damage from handling.

When not in use, respirators will be stored to protect them from physical damage, sunlight, extreme temperatures, and excessive moisture.